

Sport Diver

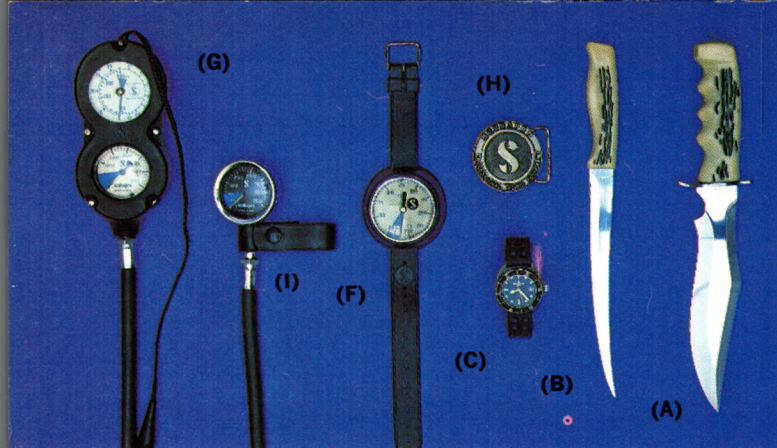
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THE JOURNAL OF SPORT DIVING

VOL. 2 / FIRST QUARTER 78



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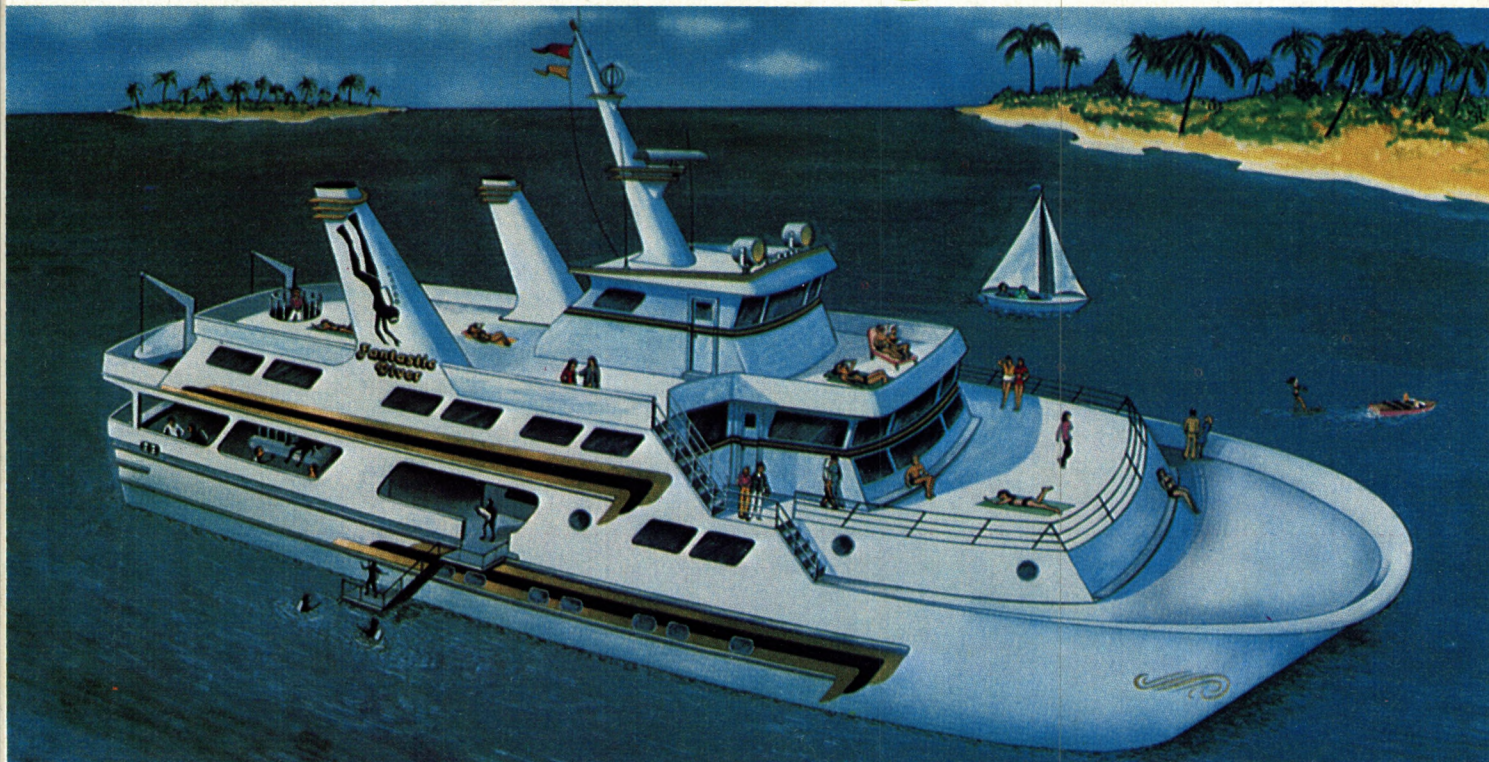
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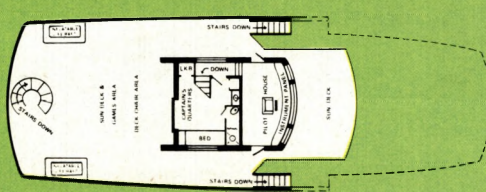
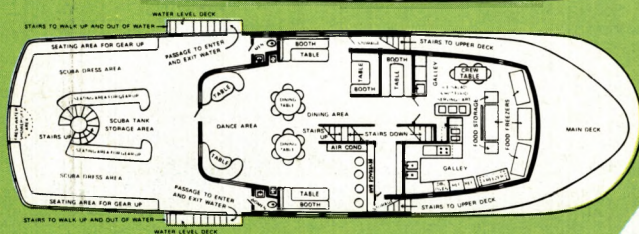
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CONTENTS

VOL. 2/FIRST QUARTER 78

THE BAHAMAS

Bimini

Ned DeLoach

The best bargain in Bahamas diving. Bimini offers a variety of good diving for an affordable price.

12



THE STATES

Underwater Ice House

Ken Hafner

Prime real estate cheap! Fabulous family home located in choice spot under Lake Superior - 15 fathoms deep.

21



PROFILE

Rick Frehsee

Richard Stewart

An exciting selection of pictures from one of the world's leading photo-illustrators.

29



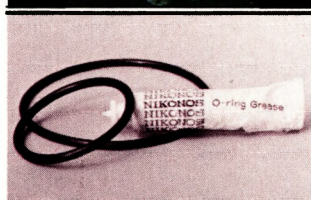
UNDERWATER PHOTOGRAPHY

Equipment Maintenance

Richard Stewart

Keeping your camera dry while you're wet.

58



GALLERY

Australia

Rick Frehsee / Richard Stewart

Going down downunder: The Great Barrier Reef's unique resort, Heron Island.

64



DEPARTMENTS

New for 78	35
Edible Sea	39
Instructor Notes	45
Reviews	51
In the News	56
Beneath the Sea	76
Seacology	90
Washington Currents	115
Working Diver	128
Pro Dive Store Directory	139

COVER: A moray eel (*Gymnothorax mordax*) is surrounded by cleaner shrimp (*Hyppolysmata californica*), a good example of the symbiotic relationship between these two species. Photo by Stephen Earley.



81

THE STATES

Florida Shipwrecks

Rick Frehsee

Blessed with the country's longest coastline, Florida also has an abundance of exciting wrecks.

93

CARIBBEAN

St. Croix and the B.V.I.

Richard Stewart

Extraordinary diving in Cane Bay and the wreck of the *Rhone*.

108

CANADA

Vancouver's Race Rocks

Emerson Mulford

Cold water, fast currents, and colorful marine life add up to a spectacular dive in British Columbia.

118

OCEANOGRAPHY

Blue Hole Diving

John Larsen

What caused the formation of the Bahamas' blue holes?

122

SALVAGING THE PAST

The Monitor

Ben Wilson

Divers recover artifacts and become the first men to touch the Civil War giant since it sank 115 years ago.

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Photography by Richard H. Stewart

Editorial

FROM THE PUBLISHER

The new year of 1978 will begin what looks to be another exciting year for the sport diving industry and *Sport Diver Magazine*; already we have far exceeded our expectations for our first two issues. More people will become involved in diving this year than ever before. Manufacturers will be introducing some unbelievably innovative products as we continue to advance into the undersea space age. More and more professional dive stores are preparing for the new season by updating their training facilities and techniques with the addition of proven audio-visual programs. Sport divers everywhere are demanding reading material that can entertain and inform them concerning the increasing interest in underwater photography, travel, and the continued quest for the preservation of our seas.

Sport Diver Magazine clearly recognizes the needs of today's responsible progressive diver and we have dedicated ourselves to producing the most colorful quality diving publication in the world. To keep up with these demands we have, for 1978, added a number of new departments to our contents. For

those interested in the activities of the professional diver, we have added the "Working Diver" with the hopes of exposing the various underwater professions, their opportunities, the glory and hardships, and other general information. To keep up with the fluctuating whims of our government we have added "Washington Currents" by Philip Trupp, our Washington correspondent. This department will deal with the government's outlook on the diving industry and the feelings of various officials who are currently active divers. Later this year we will add a Commercial Diving column, by Mavis Hill, and an Equipment Q & A (questions and answers) column, by Steve Matheny.

During the past year we have experienced the increasing numbers of divers and non-divers joining the ranks of a new and stronger movement towards the Save the Whale/Porpoise campaign. These animals have an equal, if not greater, right to the sea than man does. If these beautiful mammals are depleted more, their eventual extinction is virtually assured. The preservation movement is evident not only among those involved with the sea, but also in others.

During the concerts of their present tour, the musical group Crosby, Stills, and Nash has projected an incredible eight minute motion picture of whales accompanied by a soundtrack which they perform live. This is their way of telling the world of the growing problem. The slaughter must be discontinued now, and unless something is done about it today, man will ultimately suffer the loss. Join the staff of *Sport Diver* and thousands of divers around the world by voicing your opinions to your government; support the organization of your choice and help save our seas.



RH Stewart

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LETTERS

Dear *Sport Diver*,

I am a subscriber to your fine magazine and am most impressed with your first issue. Wishing you continued good luck with *Sport Diver*.

Joe Strykowski,
Chairman, YMCA Committee for Underwater Activities

Dear *Sport Diver*,

All scuba divers are taught to have their regulators in the shop once a year for a maintenance check. What about those who dive often? For example, I will have approximately 40 hours on my regulator in a year's time. I would like to make a suggestion to the manufacturers. Recommend a maintenance program for all life-support equipment, especially regulators, by suggesting frequent maintenance, after so many hours or years of usage, whichever comes first.

Dennis Hill
Orange County, California

Dear *Sport Diver*,

We in Haiti are most impressed with the article on diving in Haiti, written by Richard Stewart and published in your Volume 1, Number 2. I would like to mention that Phil Chalker is one of the most conscientious divemasters to be encountered anywhere. It should also be noted that the flight from Miami to Haiti is only one and a half hours.

We also appreciate your help in erasing the negative impressions regarding Haiti that have been created by an uninformed press. Since 1971 Haiti has made itself very interesting to tourism development and foreign investment. In fact, Haiti is becoming the touristic frontier of the Caribbean. Again, we express our appreciation for your accurate and well written article. Information concerning Kyona Beach diving should be acquired direct from Kyona Beach, P.O. Box W-47, Port-au-Prince, Haiti, West Indies.

Brad Smith
Port-au-Prince, Haiti

Dear *Sport Diver*,

I'm a professional diver and I have contacts with many firms from different countries producing diving equipment. I have managed to buy your magazine lately. The beautiful pictures and interesting problems you have written about have made a great impression on me.

After reading your magazine I have decided to write to you. Would you please

Sport Diver

send me some more papers, magazines, or catalogues if it is possible. I will be very grateful, because in that way I will be able to learn many new things connected with diving and the submarine world. Thank you very much.

Jerzy Rutkowski
Bydgoszcz, Poland

Dear *Sport Diver*,

I have read your second issue and was immediately sold on *Sport Diver*. I would be happy to receive any four issues from you, whether number 1 or 2 of Volume 1, or the ones next to come. Being Canadian, I am ACUC certified (equivalent to YMCA) and dive commercially for a construction company and also skipper two tugboats.

Diving in Haiti may not be as great as in the Bahamas or Cozumel, but it is still interesting. As you have said, there are lots of sponges, original coral, and even black coral. Please accept and transfer to your staff my congratulations and best wishes.

Richard Potvin
West Indies

Dear *Sport Diver*,

We appreciate very much your concern in our diving business and consequently thank you for the informative material sent about your magazine. As our diving business deals only with equipment rentals, dive tours, etc., we cannot retail your magazine in our shop. However, as we are the nucleus of a diving club in operation on this island, we will endeavor to encourage its members to subscribe to your magazine.

Diving in St. Vincent is virtually undiscovered, hence our exotic coral reefs are unknown to a majority of your readers. Being the oldest dive shop in St. Vincent, we are of the firm opinion that such picturesque scenes of the inner space should be given some attention. It would take a magazine like yours to enlighten quite a vast number of participants in the sport.

Anthony Regisford
Mariner's Inn Scuba Boutique
St. Vincent, Virgin Islands

Dear Steve,

I just wanted to drop you a quick note to tell you how great it was meeting you, and Kathy Bentley, at Photo Marketing Associations' Fall Seminar in Atlanta. Being an avid, if not obsessed, SCUBA enthusiast, I can't tell you how happy I was to find a quality-minded publication like *Sport Diver* Magazine on the market.

I've read the second issue cover to cover now, Steve, and it's terrific. I

particularly enjoyed the article on the history of diving equipment, and I'm extremely glad I'm a diver of the 1970's. After all, some of those ideas!

I've sent the press release on the Vivitar 365 Electronic Flash Unit I promised, and will put you on our mailing list to make sure you receive the latest on Vivitar products that might be diving related. In fact, I've just learned that there is an outfit called Sea Research using our Vivitar 118 Flash on 110 pocket cameras in specially designed housings. I'm sure you'll agree the only way we can tell non-divers what it's like is through U/W photography — and you and your magazine are the key there.

Let me know if I can help out in any way, and give my best to the *Sport Diver* staff.

Barry H. Goldberg
Manager, Public Relations
Vivitar Corporation

continued page 10

ATTENTION INTERNATIONAL READERS

We sincerely hope that our readers outside of the U.S. enjoy the contents of *Sport Diver* Magazine. *Sport Diver* is truly international in its design and format, and we especially encourage contributors who can submit articles or news releases on diving activities around the world.

The single copy price of *Sport Diver* outside of the U.S. is \$2.45 U.S. due to the increased postage and handling costs. For those considering a subscription, please send \$9.95 U.S. in the form of a bank draft redeemable in U.S. currency. Your magazines (4 issues) will be mailed via surface transport. If you wish to speed delivery of your subscription, airmail subscriptions are available at the rates indicated below:

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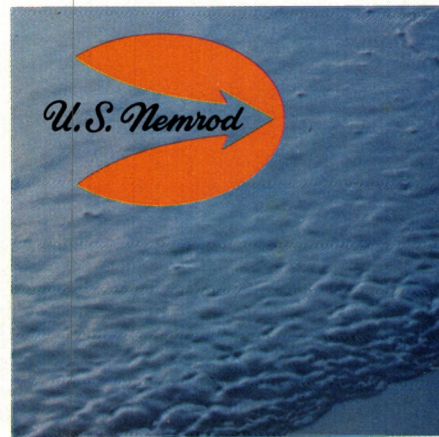


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LETTERS

continued from page 8

Dear *Sport Diver*,

I have just received your letter concerning publication dates and I totally agree with you. Quality does come before quantity. You've done a wonderful job in the area of articles, photography, and printing, and are making *Skin Diver* obsolete.

In response to your statement concerning what I would like to see in *Sport Diver*, let's start with good old South Carolina. I have not seen an article about South Carolina diving in any diving publication. I would also like to see more articles concerning marine life, fishes, eels, etc. I also tip my hat for the article about sharks in the first issue of *Sport Diver*. I think it is about time people stopped thinking of sharks as gruesome, bloodthirsty man-eaters. They are as interesting and colorful as many of the other highly exalted marine inhabitants.

Once again, I would like to express my support and thank you for the courteous letters.

Will Harley
Kline, South Carolina

Dear *Sport Diver*,

I own and operate a full-time dive store. I want to congratulate you on your fine new magazine, *Sport Diver*. For years we have had a poor or even negative influence exerted over our industry by very poor industry news coverage. Thank goodness for a positive influence in a fine and progressive magazine.

The articles by Steve Matheny and Bret Gilliam get toward identifying a basic ill within our industry. It is stimulating to see articles by respected instructors, like Matheny and Gilliam, who clearly identify and outline some of our industry's basic problems. These problems have been the major, if not the sole, reason for the real lack of growth in diving. It is very important for the sport diving industry to get out of dependence on the poorly trained, amateur instructor, and to begin also to view new and improved diving equipment for the advantage and benefit that it really is.

Your photography is excellent and so are the articles going along with the photographs.

I would like to make one adverse comment. The article, "Can Diving Hurt Your Hearing," by Mr. O'Keefe, is definitely out of place in any progressive diving magazine. I am not commenting on the right or wrong of his ideas. He says it

continued page 20

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Bimini

Story and Photography
by Ned DeLoach

Bimini has long been known as the billfishing capitol of the world.

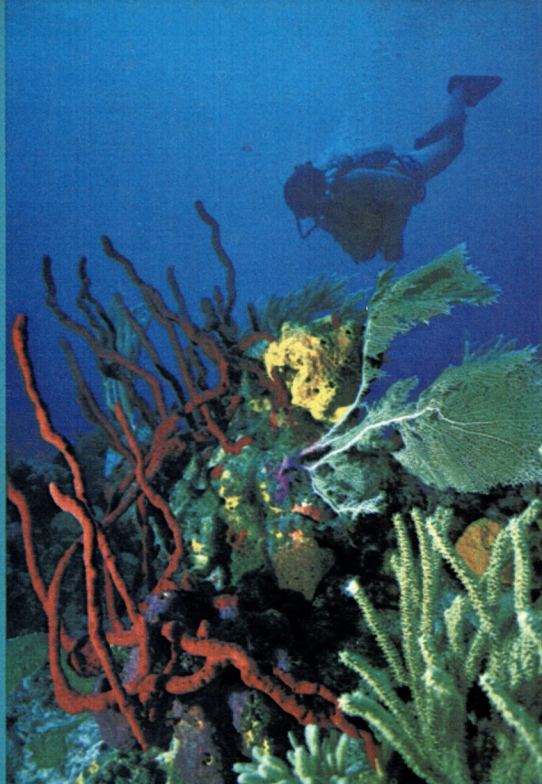
On any given weekend the marinas that line Bimini harbor are filled with some of the finest sport fishing boats to be found. The reason for the island's popularity with



A diver enters the wreckage of the old concrete ship Saponia. North Bimini, (inset) long known for its fantastic fishing, has become popular with sport divers also.

fishermen is the deep blue Gulf Stream that runs just off her western shore, producing some of the most magnificent game fish ever caught, including over 50 world records.

Just 45 miles due east of Miami, Bimini is a short run for the sleek-



hulled fishing crafts which use her for safe dockage. As the first rays of the red morning sun spread across the Atlantic, the boats line up to pass through the narrow cut between North and South Bimini. After a long day the same procession returns from another day's fishing in the Stream.

Bimini has always been special to the many sport fishermen who know and love her waters. Fishing is a pleasure to be savored, and they take it very seriously. The people of Bimini understand their love, and this understanding has created an atmosphere on the small island that is unique. The hotels, restaurants, bars, and people of Alice Town supply the hardworking sportsman with facilities that help make his

day complete and satisfying.

Today, sport divers are learning that the island which has offered the fisherman so many thrills can provide them with spectacular underwater beauty. Both the divers and the dive boat operators that run trips from the island take their sport just as seriously as do the fishermen, so they blend in well with the prevailing mood. Bimini is not like many diving resort areas that schedule only a token day of diving. If you come to Bimini, plan to dive; you will enjoy long full days of underwater recreation on some of the Bahamas' most colorful reefs.

Underwater Adventures, Bimini's only island-based diving operation, is headed by Neal Watson. Neal is one of sport diving's

most exciting personalities. When he's not busy with dive charters, you'll find him training for one of his many record setting endeavors, such as the world's longest underwater swim. He is also a treasure hunter, an underwater stuntman for movies and television, a master karate instructor, and a pilot who has made a 105 mile gyrocopter flight over open sea.

Neal's diving packages, among the best and most inexpensive in the Bahamas, are available to prearranged groups of from four to twenty-four persons. His most popular offering, the two day/one night weekend plan, includes round trip air fare from Ft. Lauderdale to Bimini, ground transportation, room (double occupancy), all meals, three tank



Hawksbill Reef is just one of the exciting reef complexes near Bimini (top). Small surpolids (mid) add to the beauty of Hawksbill, which also has a number of large basket sponges (bottom). Small tropical fish often make their homes in and around the large sponges. The Bimini Wall (right) is a dive for the more experienced only.

dives per day plus snorkeling, with tanks, air, backpack, weights, and weight-belts included.

Your itinerary for the weekend starts at 8:30 a.m. at Ft. Lauderdale International Airport. There you meet Neal and connect with your reserved charter to Bimini on Atlantic Coastal Airways, and, after a 30 minute hop

across the Gulf Stream, you land at South Bimini Airport. From there you take a bus to dockside and are ferried across the cut to your hotel in Alice Town on North Bimini. You check into your room and then load your diving gear onto Neal's 34 foot custom diving barge. Less than twenty minutes later

you're suiting up for your first dive, a plunge into 80 feet of water on fabulous Hawksbill Reef!

As you glide down the anchor rope you instantly understand what Bimini diving is all about. Huge multi-colored coral heads surge upward from a white sand bottom, forming one of the most exciting reef systems in the



Turtle Rocks, site of the Sapona, supports a variety of sea life. A large sea fan and fan worms are seen on one of the undercut shelves of the Rocks (lower left). Tom Guarino (left) explores the reef at Cat Key, south of Bimini. The many crevices and caves harbor a stunning variety of game fish and lobster. At right a diver gets his first look at Hawksbill Reef.



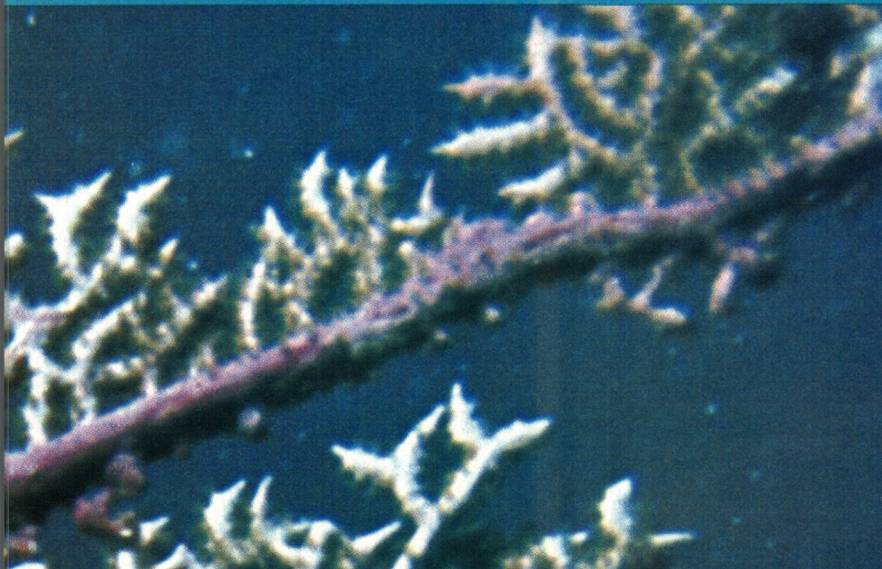
Bahamas. You find yourself surrounded by a coral complex that spreads as far as the eye can see in every direction. Large schools of fish drift effortlessly around the many sponges and soft corals that adorn the splendid growth.

After the dive you enjoy an excellent lunch on board the barge while you rest and decompress. For your second dive, Neal takes you to the inner fringes of Hawksbill where the depths range from 30 to 40 feet. Here the coral heads are smaller and more scattered, but the underwater colors and small tropicals are even more striking. The shallow depths, clear water, and vivid colors of the abundant sea life combine to form an excellent spot for

underwater photography.

The third dive is a short distance inland from Hawksbill, at a shallow patch reef area. If you choose, this is a great free diving site with depths averaging 20 feet.

The sun will be setting as you head back to Alice Town. After dinner at Brown's Hotel you enjoy a leisurely stroll along the King's Highway that runs the length of the town. The people are friendly, and the gift shops stay open late. Afterwards you can take a moonlight swim at the beautiful shallow water beach on the east side of town, or drop in one of the many bars for island entertainment and drinks while you swap stories about the day's diving. Be sure to take the time



This goldentail moray peeked out to investigate when we began swimming around its lair.

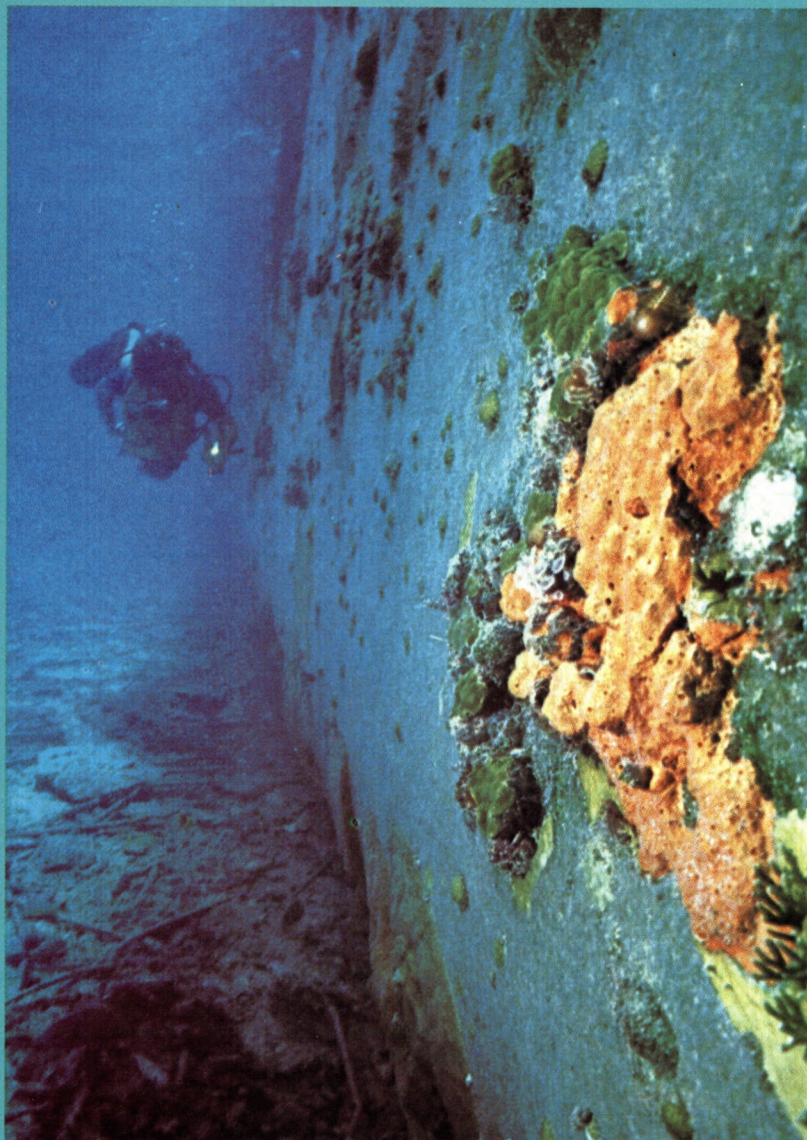


to stop at the Compleat Angler Hotel and Bar. The walls of the library and lobby are covered with a fascinating collection of game fish pictures, many of which date back to the days when Ernest Hemingway was a frequent and celebrated guest on the island.

After an early Sunday morning breakfast you join Neal for your second day of underwater adventure which begins on the edge of the Bimini wall. The experienced divers shelf drift at a maximum depth of 140 feet, flowing north with the current along the breathtaking precipice with 100 feet of clear water above, and 1000 feet of dark blue infinity below. Next you head south to Turtle



The prop of the Sapona rests on the sandy bottom in 20 feet of water. Colorful sponges (inset) and tropical fish can be found on any of the Bimini reefs.



Rocks for a dive along a series of small undercut shelves.

After lunch on board you set out for a wreck dive on the broken remains of the 300 foot ship *Sapona*. Originally a World War I transport, the history of the *Sapona* has become more interesting since she ran aground near Turtle Rocks. During Prohibition she was used by rumrunners as a storehouse for their goods. After the Coast Guard got wind of this scheme she was towed to her present location to be used as a target for aerial bombing practice. It was from this site that the now famous Avenger fighter plane squadron had its last contact with home base before being lost forever in the Bermuda Triangle. Now the hull rests in 20 feet of water, creating a

safe and rewarding dive. Her sides are covered with colorful marine growth, and she offers protection for a large variety of fish life. Hours can be spent exploring the broken machinery that litters her interior passages.

Two days and six tanks later it's time to head for your plane. It's hard to imagine so much underwater adventure packed into one weekend. Neal also offers packaged trips from three to seven days. With the extra days you can cover even more diving areas, including a trip south to Cat Key and the Victories. Here a different type of reef formation exists, instead of large separate coral heads, you find the reef divided into sections by deep crevices. The top of the reef averages 40 feet below the

continued page 43



The WWI transport *Sapona* is now covered with colorful sea growth. The wreck was used by smugglers as a cache for illegal alcohol during Prohibition. Inside the holds, the broken machinery fascinates Guy Beard (above). This brilliant sponge was found in a small cave near Turtle Rocks (right).



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RELEASES

Store Owners Beware

Sport Diver has received information concerning possibly dangerous blow out plugs from Carson Lindley at the Alaska Aquatic Dive Center in Ketchikan, Alaska.

In examining scuba cylinders brought in for VIP or hydro, it was noted that some of the valves had lead filled blow out plugs with blow out discs underneath the lead.

After trying unsuccessfully to obtain blow out specifications from the plugs' manufacturer, Lindley adapted a tank valve to a hydrostatic test unit, and tested three lead filled plugs, both with and without the discs. Lindley reports that every plug went to 8,300 psi and held firmly. Lindley's hydro unit would not produce any more pressure.

New Haitian Dive Facility

Haiti's well known Ebo's Beach Resort, 30 minutes north of Port-Au-Prince, had recently been chosen as the location for the country's newest facility. According to Jim Scheiner, manager/instructor, the center will offer a complete program of education, sales, air, and guided dive trips. Haiti's diving is complemented by its incredible history, friendly people, and rolling terrain. For more information write: Paradise Adventures, P.O. Box 1237, Port-Au-Prince, Haiti.

Women and Diving

"Women and Diving," a day-long conference featuring lectures and workshops on topics of particular interest to women divers, will be held Saturday, February 11, 1978, at the Wellesley College Science Center, Wellesley, Massachusetts.

Co-sponsored by the National Association of Underwater Instructors (NAUI) and Aquawomen, an all-women

continued page 48

The "IN" islands are the "OUT ISLANDS" in the Bahamas

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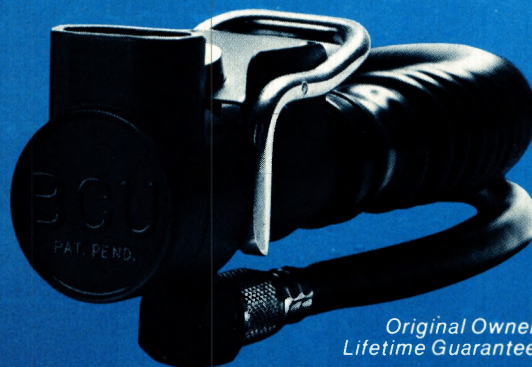
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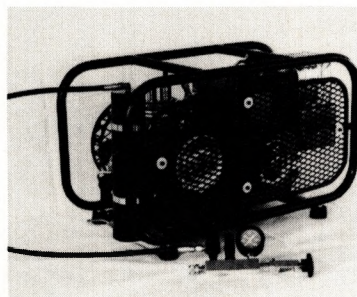
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LETTERS

continued from page 10

himself in the next-to-the-last paragraph . . . "The occasional sport diver has little to worry about" . . . but the chance of the potential new dive customer reading that far is very small. The point is this: Magazines such as yours **MUST** show the real, positive side of diving. For too long, potential new dive customers have been able to read and verify in industry magazines their basic fears without ever really knowing what is the real, whole overall perspective for those fears.

Every new diver or potential diver is characterized by one major fact: He is full of fear. Some of these fears have some foundation, some are quite unfounded. Most new diving aspirants are afraid of: not being able to breathe underwater, drowning, damaging their eyes, damaging their ears, becoming impotent, getting the bends, having an embolism, being eaten by a shark, and so on. I know of no other sport where the participant actually worries about being eaten alive. These are but a few of their describable fears. That these intelligent people have these fears is reason enough to accept the fact that they will be aware of, and wary of, any and all substantive truths which may arise in the medical or scientific world supporting any possible harmful effects they may find from sport diving.

It is simply not the proper place to put up frightening articles supporting these fears in a magazine about sport diving or skin diving. A fully responsible industry magazine will take as its approach to help interest and stimulate the new student. By leaving the fear and problem areas to be approached in later, more intensive and balanced education, the new student will gain a balanced picture of the true nature of his or her true risks. He or she will also learn how to eliminate and/or minimize both unreal fears and the more direct risks inherent in this activity.

We have had years of stories of barracuda and sharks, ear damaging and divers being "squeezed," "compressed," "blown up," etc., etc. in the "other" magazine. Please give us a magazine that we can sell and recommend to our new customers without having all the old, out-of-balance fears being hashed out over again—or new ones brought up.

Thanks again for a new and refreshing diving magazine. We are all looking forward to your third issue.

Clifton M. McClure
Director, Aquaspace Divers
Huntsville, Alabama

continued page 48

Energy Is Everybody's Business Let's Start Saving



The depths to which a person sinks . . .

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UNDER WATER ICE HOUSE



For sale by owner, \$40,000. Three bedroom home, fully furnished, with three water beds, full bath, den-size aquarium, and beautifully carpeted, sunken living room. Nice location *under* Lake Superior a mile from Madeline Island, the largest of the Apostle Island chain along the northern part of Wisconsin. Depth-90 feet.

Story and photos by KEN R. HAFNER



The easiest way to get a house across three miles of water is to wait until winter and truck it across the ice. Seems logical, right? As 30 tons of house, truck, and trailer rolled onto the frozen surface of Lake Superior, bystanders stared in disbelief. Many were later heard to say, "I told the damn fools it wouldn't work." Of course, an ounce of foresight is worth, in this case, 60,000 pounds of cure, as divers Ken Hafner and Larry Race were soon to find out. In order to save the house from being crushed by shifting ice, a marine contractor placed sandbags on the roof and inside the living room. Ken and Larry were asked to film the position of the house and truck underwater and then to remove the sandbags prior to lifting the house. Upstairs they found a couch floating at eye level, levitated by its buoyant cushions and wooden frame. When an

On Wednesday, March 2, 1977 at 2:15 p.m., Lake Superior engulfed another work of man. She claimed a semi-truck, trailer, and a seven room, fully furnished home. The house was being transported from the mainland just south of Bayfield, Wisconsin, across 30 inches of solid ice to Madeline Island some 3 miles away.

It all began Wednesday morning when the crew from Dale Movers, a heavy moving firm based in Minneapolis, Minnesota, picked up a summer vacation home owned by Paul and Delores Huber, also of Minneapolis, and slid a framework of beams, timbers, and dolly wheels under the house and attached the entire apparatus to a ten wheel diesel tractor. The house was then carefully pulled three blocks to the entrance of the boat launching ramp

at Port Superior, near Bayfield. When the 30 ton rig rolled onto the ice, loud cracks were heard. Spectators shook their heads in disbelief, but the driver continued on. A 40 foot wide road had been plowed through the snow across the ice to Madeline Island, and ice thickness tests were made just prior to departure. The tractor and house rolled steadily to within one mile of Madeline Island when without warning, the driver's side of the trailer crashed through the ice. A foreman for Dale Movers, Lyle Rhine, was driving the truck and quickly jumped out. He tried to release the tractor from the trailer, but his efforts were to no avail. Within three minutes the tractor began to sink. Harvey Nourse, a passenger, jumped to safety shortly before the tractor disappeared from

sight. One hour later the roof of the house was the only thing still above the ice.

As is the case in most disasters, one man's misfortune is another man's gain. People from all over began to flock into the small town of Bayfield to gawk at the only house to have sunk in Lake Superior. Business in all the motels and diners was booming. I arrived within a week of the sinking to film and document this strange occurrence.

The weather in Bayfield had been unseasonably warm, with heavy rains during the past week and there was up to 12 inches of water on top of the ice leading out to the house. Larry Race, Howard Heath, and I loaded up our equipment on a toboggan pulled by a snowmobile, and headed for the



impatient crane operator attempted to lift the house before the sandbags used to sink it were removed, the first floor collapsed and sank, joining the semi-tractor trailer on the bottom of the lake. The semi and trailer were practically the only things salvaged intact from the whole operation. The refrigerator was found floating halfway between floor and ceiling in the kitchen which, save for the aqueous atmosphere, seemed normal in every respect. It seems convenient to have a huge swimming area just outside the door and a good fishing hole under the balcony, but the home's owners figured it would be a hassle to have to wear scuba to bed. After Ken and Jerry Provost attached a cable to the main beam, the house was towed into shallow water.



south end of Madeline Island. Arriving, we found a lot of broken ice near the site, allowing us to dive through any one of numerous holes for penetration into the house.

With Howard Heath as surface tender, Larry and I lowered ourselves into the frigid water. At 20 feet, near the bottom of the house, we saw that the living room sliding glass doors were open. We ventured inside and found that almost everything was floating against the ceiling. The sofa, chairs, tables, pillows, and linens were tight against the rafters. The fireplace and two bookcases were still in place and looked very impressive. From the living room we explored the kitchen. There we were stunned to see a 250 pound refrigerator suspended three feet off the floor and two feet from the ceiling. Other things that you

might visualize in your own home, such as a box of Electro-Sol dishwashing soap and a dishwasher full of dishes, were scattered about.

Upstairs in the den, we came across a hide-a-bed suspended in the room with a large oil painting on the wall in the background. Just outside of the den on the upper balcony was a sheet of ice at least 25 feet across, perhaps the ice the house was on when it broke through. After swimming through the rest of the house, we descended to the truck, 50 feet further down. "Dale Movers, The Best in Heavy Moving, #30" was painted on the side of the ten ton truck, which had sunk to its axles in the silt. I opened the door and removed the keys from the ignition. Later I gave them to the owner with the comment, "I couldn't start it, I think it's flooded."

During the week of March 15th, Ed Erickson, a marine contractor from Bayfield, placed 40 or 50 sandbags on top of the roof of the house and some inside the living room to force the house through the ice. If it wasn't sunk, the ice floes would surely have crushed the remainder of the house.

A month later I was asked by Ed Erickson to film the position of the house and truck on the bottom of Lake Superior and assist in their removal. On April 16th, Larry Race and I once again dove the truck and house, this time from the deck of a 103 foot LCT (Landing Craft Tank) that last saw action in the Normandy Invasion during World War II. This dive revealed that Lake Superior was taking its toll. All the drywall was coming loose, paint flecks clouded every room, and



The End.

many of the items which had been floating were now waterlogged and lying on the floor.

Plans were made to remove the house and truck on Saturday, April 30th, but on Friday night, April 29th the LCT *Outer Island* sustained extensive damage to her superstructure and galley when a propane tank exploded, shaking the whole town of Bayfield. A four foot hole in the floor of the galley suggested sabotage, but the fire marshal determined that a leaky propane hose was the cause of the explosion. The date of removal was pushed back to May 9th.

Seven o'clock came early on the 9th of May, but the serenity of the calm lake was quite appealing. Taking Kirby-Morgan communication units with us, Jerry Provost and I descended to the roof of the house. We attached cables through the house on the main beam. When we ran out of air, 15 of the

sandbags used to sink the house were still on the floor inside. With our tanks dry, we needed to refill the air cylinders and acquire some surface interval time, so we headed for Bayfield. When we returned three hours later, we learned that the captain had attempted to lift the house with his 100 ton crane. Upset by his impatience, Jerry and I descended to remove the sandbags in the living room. When we found the roof of the house at 30 feet, 25 feet shallower than it had been, we were sure something was wrong. Following the walls of the house, we entered the sliding glass doors, only to find that the floor had fallen out. Sure enough, 20 feet below was the floor and all the furnishings. After inspecting the cables attached to the house, we surfaced to witness the lifting. The roof of the house finally broke the surface as spectators aboard a local excursion boat looked on.

From here it was a four hour ride to Bayfield, with the house just above the surface. That evening, the shell of the house was parked 500 feet from shore in 30 feet of water. Bayfield's homecoming was not to happen this day.

On Wednesday, May 11th, the remainder of the house furnishings were removed and returned to Bayfield. Cables were again connected to the house and it was towed into ten feet of water and left next to the dock of the Bayfield Yacht Club. Thursday, we removed the furnishings from the second floor and dismantled all the doors and windows. From here it was up to a large crane on shore, which spent the rest of the week picking the house out of the water piece by piece. The remains of this once beautiful summer home will now be used for firewood. Lake Superior, it is said, never gives up her dead!





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THE FIFTH WORLD UNDERWATER CONGRESS

For the last four years an annual conference has been held by the World Underwater Federation (CMAS), sponsored jointly by CMAS and the host country's Federation. Until 1977, the conferences had all been held in Europe. This year the conference enlarged its international scope by moving to Australia. Co-hosted by the Australian Underwater Federation in Brisbane,

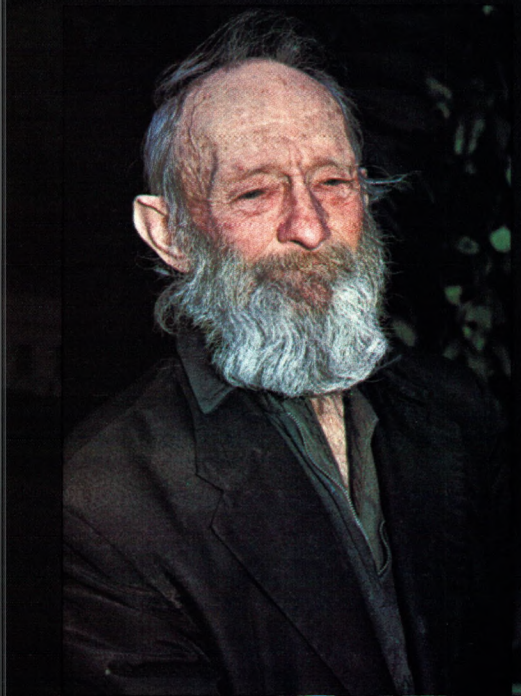
Australia, the conference was named Downunder '77 and was the first major diving conference to be held in the Southern Hemisphere.

Under the deft direction of FAUI head, Andrew Maluish, Downunder '77 opened Saturday, September 10, at the Crest Hotel, Brisbane. The International Underwater Photography Competition display, also sponsored by CMAS and FAUI, opened on Saturday at Brisbane City Hall.

Four symposiums were organized, each with a general topic: Scientific and Marine Archaeology, Artificial Reefs, Underwater Sports Medicine, and Underwater Education. The symposiums ran from Sunday through Wednesday, September 14. The speakers, from over 20 countries, included many internationally recognized names, such as Reg Vallintine (U.K.), Dr. Jean Tailleux (France), Dr. Glen Egstrom (U.S.A.), Dan Miochin (Ireland), Dr. J. Baker



Sport Diver



(Australia), Dr. O. F. Ehm (West Germany), Bernard Eaton of Triton Magazine, and many more.

The Photography and Publications sessions were chaired by Barry Andrewar-

Brisbane's City Hall (background photo) housed many of the exhibits which accompanied the Congress, including the photography competition entries. Australia's frontier outback country produces many rugged characters (left). The Crest Hotel (near left) provided comfortable accommodations and meeting rooms for Congress participants.

tha, Editor of *Skindiving Australia*. The participants enjoyed presentations on Wildlife Photography by Steve Parish (Australia), Underwater Movie Techniques by Ron Taylor (Australia), Preparation of Audio Visual Programs by David Philosof (Israel), and Photojournalism by Richard Stewart, Publisher of *Sport Diver Magazine*.

Evening activities included an informal session with Ron and Valerie Taylor viewing a selection of motion pictures, with informative question/answer periods interspersed. The Downunder '77 Banquet was quite well received as was the final closing and International Film Festival.

After the close of the four day program many of the participants continued on the second part of Downunder '77, a diving excursion to Herron Island on the Great Barrier Reef. Chris Boyle and his staff of

FAUI instructor/divemasters and medical personnel supervised a full week of outstanding diving near the island.

Considering the complexity and logistics of such a program, the simple completion of such a conference is an accomplishment. The outstanding quality lectures and presentations were an additional blessing, and much was gained for future international conferences. To the Australian Underwater Federation we can only say: Well done!

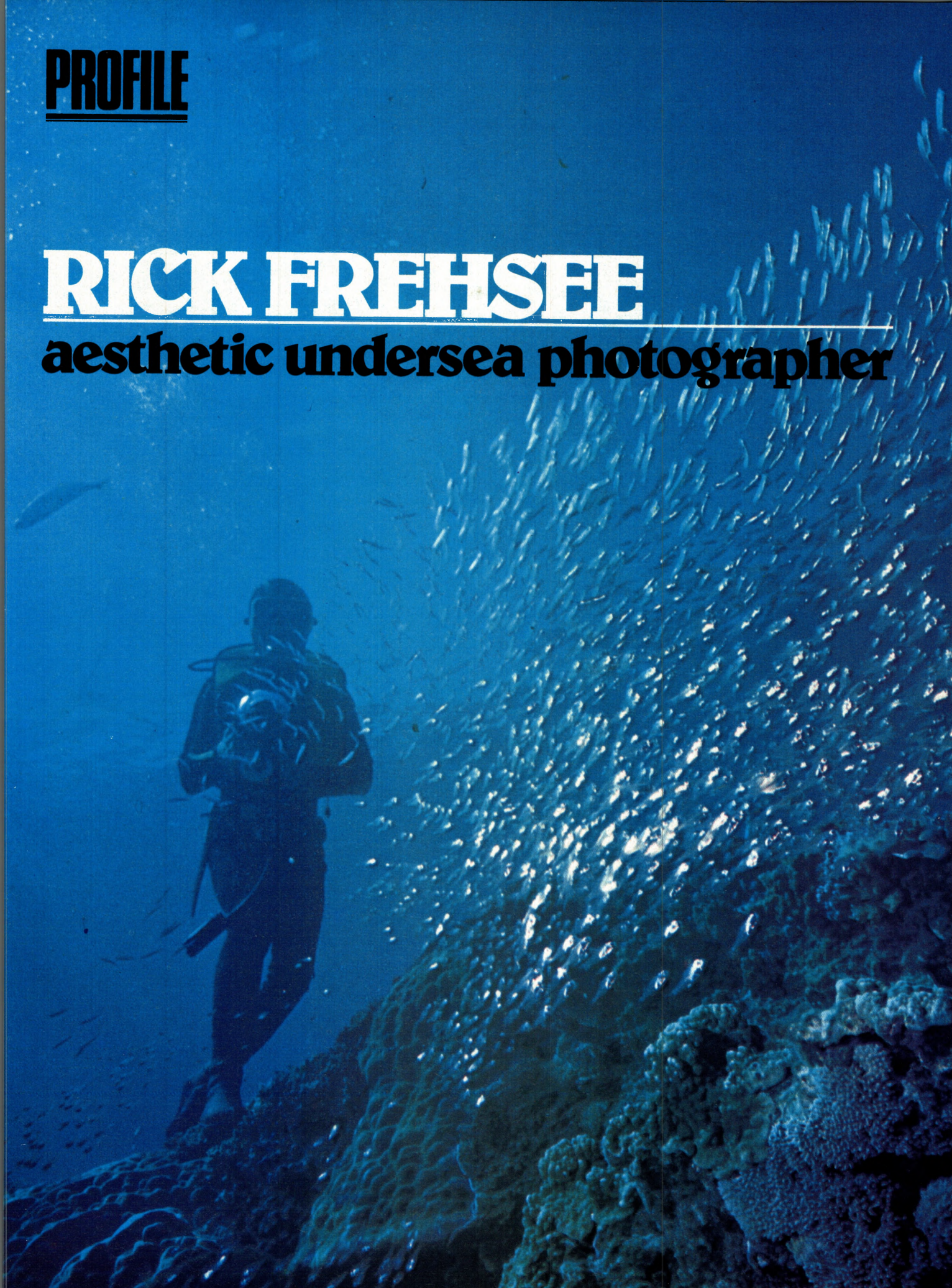


Downtown Brisbane presents a stark contrast of old and new. The famous seaport has both historic landmarks and modern high-rises (top). After the Congress seminars, participants had their choice of diving in the cool waters south of Brisbane (bottom left), or on the Barrier Reef at Heron Island. The success of the excursion to Heron Island was largely due to the competent and friendly diving staff (above middle). The Congress programs, which were held in the Crest Hotel (above left), featured many notable speakers, including Ron Taylor (above middle left). Ron and his wife, Valerie, presented many of their underwater films. Underwater photographers Steve Parrish (in blue sweater, middle right) and Neville Coleman (at right, photo far right), shared their knowledge of photography and reef inhabitants with Congress attendees.

PROFILE

RICK FREHSEE

aesthetic undersea photographer



Eight years ago a young man casually turned through the pages of a *National Geographic* magazine, gazing at the photographs with an analytical eye. His dreams were no different than those of several thousand others, the dream that someday the pages that he casually turned would display his photography. For some the dreams of success remain only dreams, and for others they have become reality. The difference stems from whether or not one is willing to place that goal at the top of their efforts, and to never take their mind off of it. The disappointments, bad breaks, and the opportunities that just come too late are all on the way to that first exciting sale.

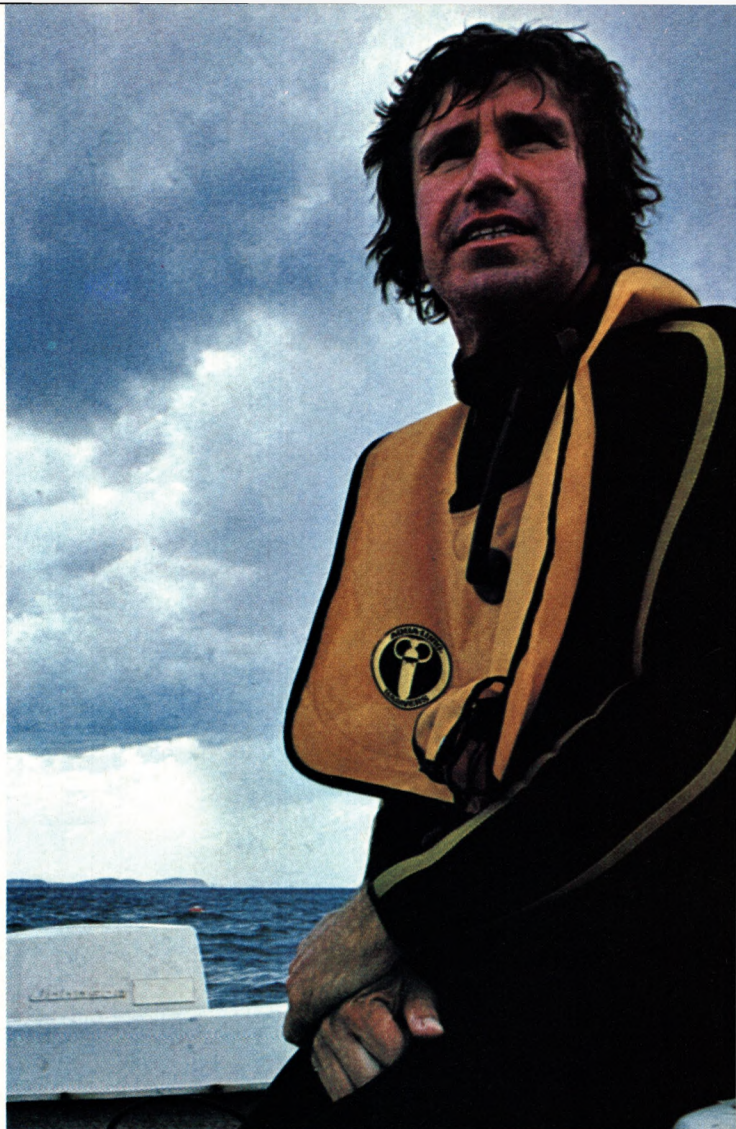
This is Rick Frehsee, a compassionate man who has realized his early dream because of his own self-determination and dedication, because he believed in doing his best all the time. Through the lean years he refined his expertise and has developed a line of credits that include staff photographer for the Bikini Atoll Expedition, still and cine photographer during the joint Cousteau/Florida State College Spiny Lobster Expedition, and the movie/TV production of *The Deadly Fathom*. Rick's credits go on and on, enough to completely fill the pages of this story.

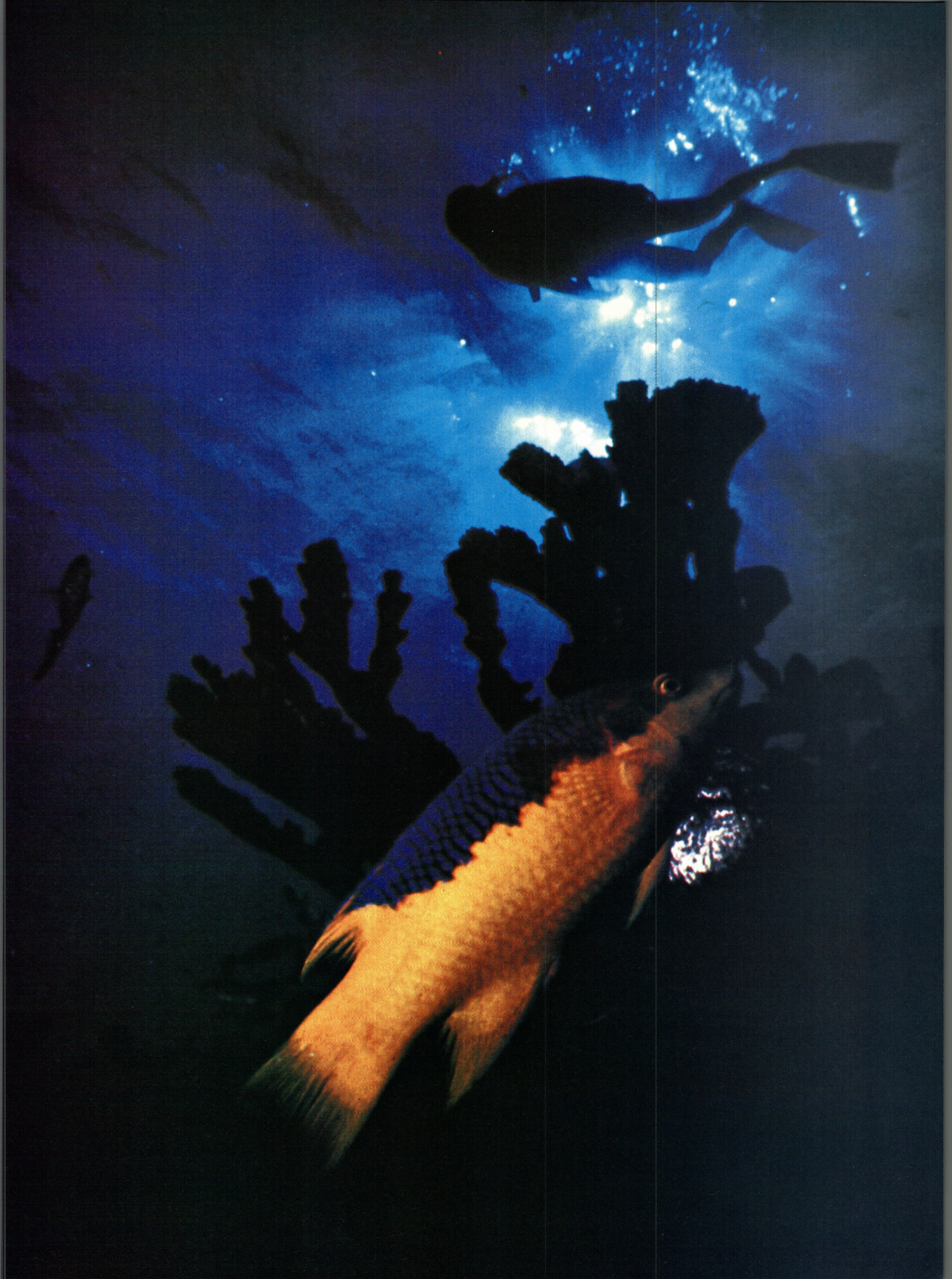
While continuing to stabilize his reputation as one of the world's most accomplished up-and-coming underwater photographers, Rick steadily became one of the most requested speaker/film presenters for film festivals everywhere: NAUI's International Conferences (IQ's), Houston's Seaspace, Chicago's Our World Underwater, Los Angeles' Man in the Sea, and the Atlanta and Tampa Film Festivals. In 1977, through his visual efforts, Rick was presented with the prestigious "Diver of the Year Award" by the Boston Sea Rovers, and the "Our World Underwater Award" in Chicago. Interestingly, these were all dreams at one time, only to come true because of a man who learned to apply himself to his fullest and to never compromise on producing the best he could.

Richard H. Stewart

"The most important consideration for me is good subject matter. I've got good equipment; Nikons in housings, Nikonoses with 15's and 21's, fisheyes, macro tubes, and underwater strobes. So what? They're not worth the price tag if you can't see a picture. I've been in the water with hobbyists who had more equipment than I do."

Sport Diver







"I suppose that most everyone in the business has influenced me at one point or another. I don't really know who especially. Jerry and Idaz Greenberg have been good friends. Jerry has probably forgotten more about underwater photography than most people will ever know."

"Shulke, Giddings, Doubilet, Church, McKenney, Roessler, Tzimoulis, Littlehales; I've watched their work closely, but I like to think I've got my own way. What is my own way? I hate to type myself, but I guess it's wide-angle people pictures. People doing things underwater, but always in harmony with the underwater world. I'm interested in drama and photo illustration. I'd hate to compete with Faulkner on fish life. I've always been interested in critters, but the market is mighty limited for that sort of thing."

Sport Diver





Richard H. Stewart



"I've been at it for eight years now, and I suppose you can say it's been a heap of great experiences, although most of the time the financial rewards are not in keeping with the effort. There are a handful of proud and rewarding moments; a photo feature for National Geographic, a color photo spread for Life Magazine (while it was still alive), a dozen Madison Avenue ads, 90-odd magazine covers, posters, and catalogs for U.S. Divers."

"I feel that good underwater photography is the result of adequate preparation, good subject matter, and well maintained equipment, sprinkled with liberal amounts of patience, perseverance, and motivation."

"The best advice I can offer up-and-comers is to study the best, try to build up to it, know the market, and shoot lots of film."

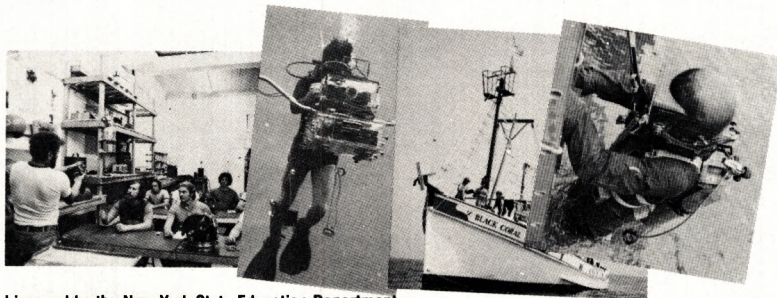


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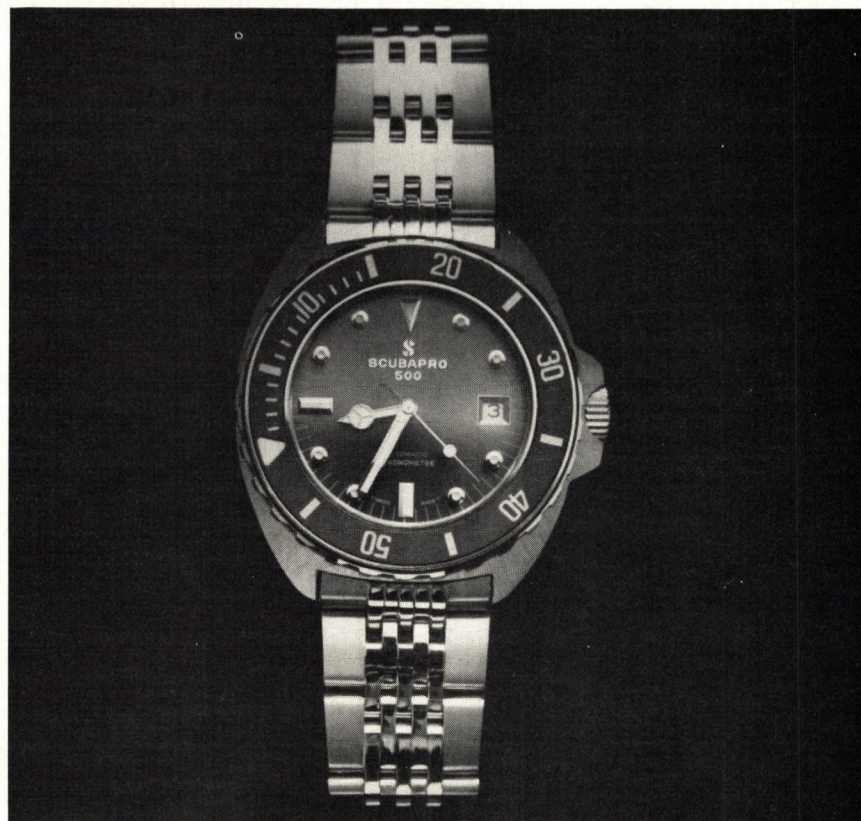
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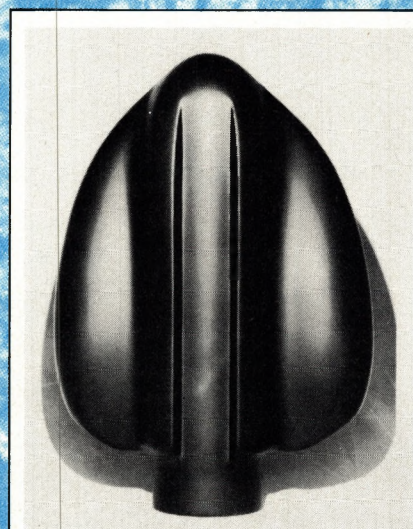
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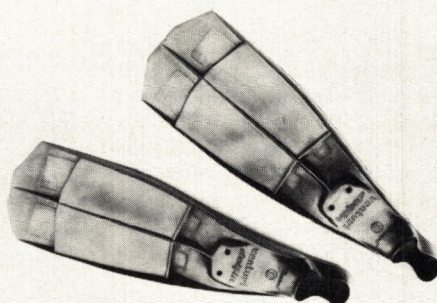


New self-draining tank boot for 80 cu. ft. aluminum tanks. 7.25" in diameter, black. Includes 3 year guarantee against boot falling off or cracking. \$4.50 from Underwater Kinetics, 7052 Convey Ct., San Diego, CA 92111.

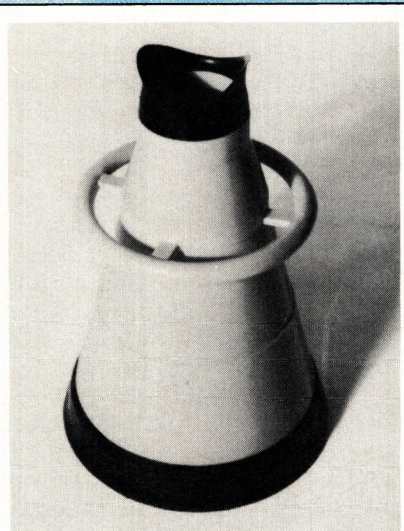
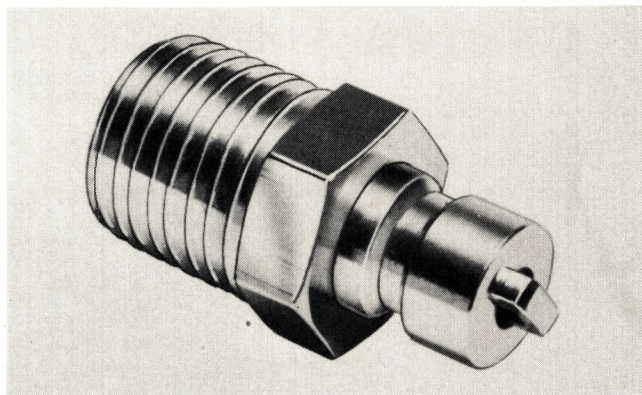


Hydro Fairing streamlines and protects all rear BCs from puncture or fouling. Built-in tank boot. Made of tough CL plastic in blue, yellow, or orange. Installs quickly. Hydro Fairing, 425-29th St. Hermosa Beach, CA 90254

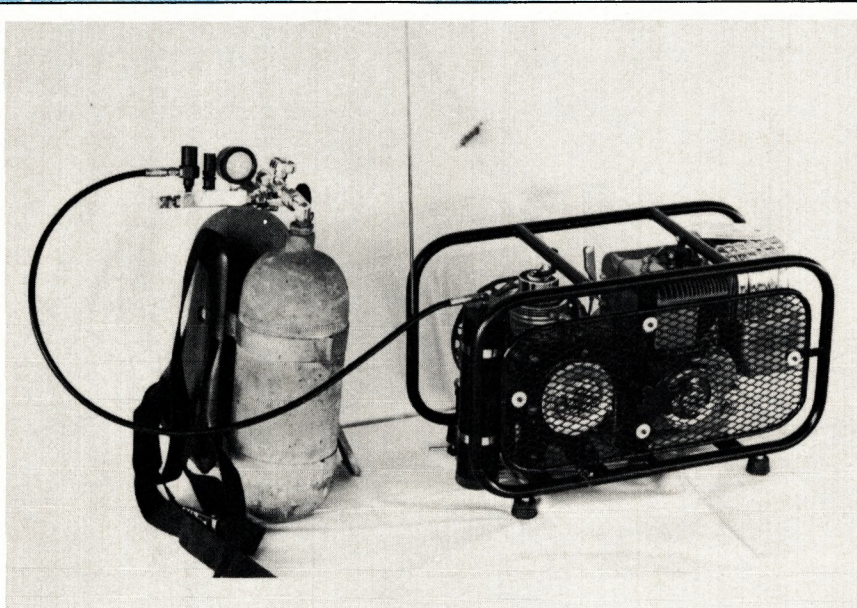
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Italian waterglass can be used for underwater observation. Made of polyurethane, unit has 1/4" tempered glass window, can be disassembled for storage. Charles Winkler, Catalina Marine, PO Box 983, San Pedro, CA 90733.



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Benson's All American anti-fog lens cleaner is now available in a 3 oz. non-aerosol spray bottle. 1 1/2" x 4 1/4" bottle fits in gear bag easily. Benson Optical Co., 6600 France Ave., Minneapolis, MN 55435.

STUFF IT . . . in this handy heavy duty gear bag by Dolt. Capacity is 4600 cubic inches, has drain holes in bottom. The Deep Water Diver's Bag is made of 11 oz. nylon and has side pocket to hold regulator and extra D rings for securing spear gun. From Westridge Manufacturing, 11920 West Olympic Blvd., Los Angeles, CA 90064.





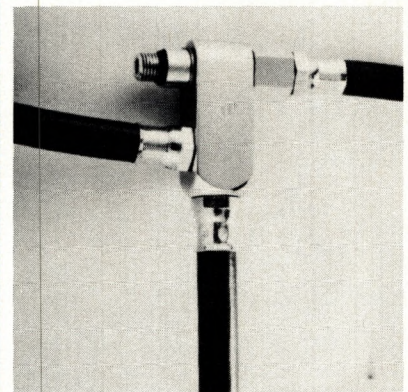
The Treasure Hunter Dive Bag is just 30 inches long yet carries 3600 cubic inches. Adjustable shoulder strap and carrying handle made of nylon webbing tested to 5000 lbs. Westridge Manufacturing, 11920 W. Olympic Blvd., Los Angeles, CA 90064.



New aluminum tank for extreme condition diving. 2015 psi capacity provides 14 cu. ft. of air. Measures 4 3/8" x 19 1/4" when equipped with K3V 3/4" valve. Dacor Corporation, 161 Northfield Rd., Northfield, IL 60093.

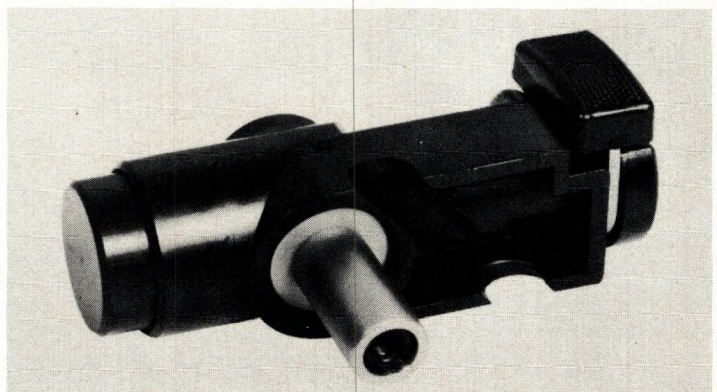


WATSON COME QUICKLY! . . .The Underwater Communications System allows transmissions from surface to swimmers in the water, lets observer hear sounds from 100hz to 3000hz up to a mile away. Talking range is 150 feet maximum, transmits 12 watts peak. 24 volt DC from two 12 volt lantern batteries. Sound-wave Systems, Inc., 3001 Red Hill, Bldg. 1, Suite 102, Costa Mesa, CA 92626.



Multi connector allows proper position of octopus, second stage and power inflators over the left shoulder without bending hose. Sportsways, 2050 Laura Ave., Huntington Park, CA 90225.

U.S. Divers' inflator attaches to L.P. hose, fills tires or surface floats. No huffing, no puffing, no hyperventilation. U.S. Divers, 3323 West Warner Ave., Santa Ana, CA 92702.

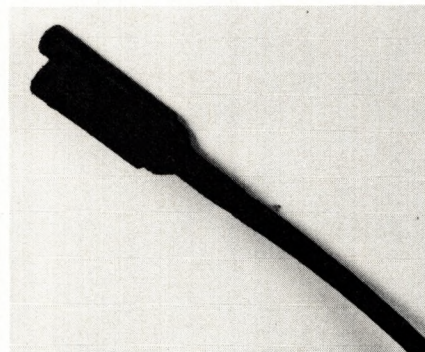
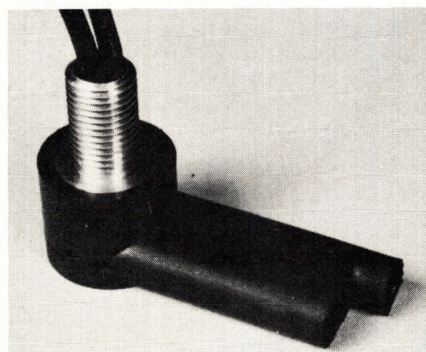
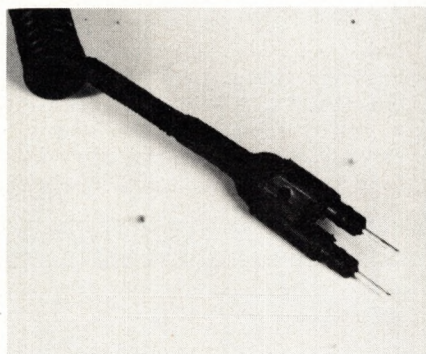




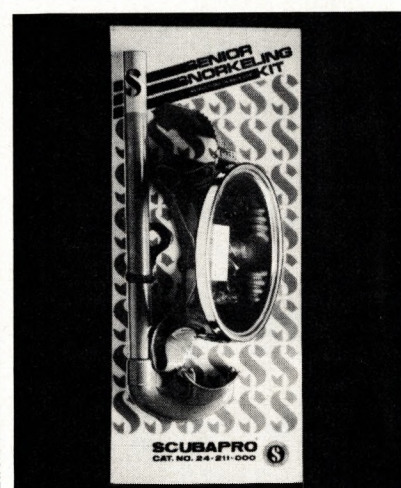
LASERIZE OFFENSIVE ROOMMATES . . . with the Vivitar 365 zoom thyristor flash. A fresnel lens in front of the flashtube moves to adjust the flash coverage for wide, normal, and tele lenses. Lets you get out to 100 feet with A.S.A. 100 film and a fast telephoto lens. Vivitar Corporation, 1630 Stewart St., Santa Monica, CA 90406



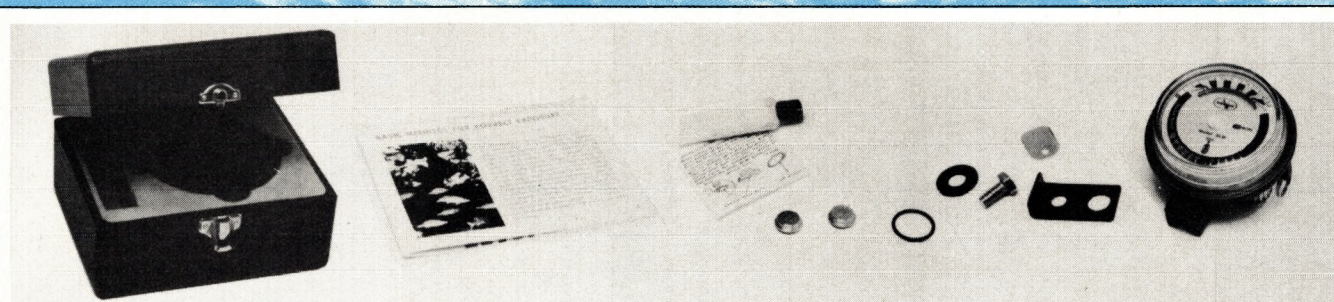
Features oral inflation with purge mouthpiece, automatic over-pressure valve, manual air dump, utility pocket, up to two CO2 mechanisms, and Seatec's push button inflation. Available in Seatec blue and burnt orange. Seatec, P.O. Box 1109, Orange, CA 92666



A new alternative to the Electro Oceanic underwater unpluggable strobe connector is the Nelson connector. Less expensive than the EO, the Nelson features silver contacts, alpha flex cord to prevent internal wire damage, ultrasonically tested for pinhole leaks, easy to plug. Underwater Kinetics, 7052 Convey Ct., San Diego, CA 92111.



New senior snorkeling kit is made of high quality light blue rubber. Couple this kit with fins and Scubapro's Snorkeling Vest 567 and get ready for some serious skin diving. Comes in assorted sizes. Scubapro, 3105 E. Harcourt, Compton, CA 90221.



Precision built, underwater exposure meter features large easy-to-read ASA scale. Non-slip ridge on ASA/speed dial assures quick, easy settings, positive friction holds them securely. Molded bracket for attachment to a variety of photo tray handles. Bracket adaptor, bolt, nut, washer, all included. Complete with owner's manual, spare battery, spare "O" ring, and silicone "O" ring grease. Comes packed in hard case with protective foam liner. Dacor Corporation, 161 Northfield Rd., Northfield, IL 60093.

THE EDIBLE SEA

by Paul J. Hill

CLAWS

To Grab A Crab

While diving for Pismo clams, I was suddenly looking up at the threatening claws of a large spider crab. My first reaction was surprise; shift-to-reverse was my second. But immediately I had visions of those big claws dipped in hot butter, and big crab legs dipped in butter are almost as good as lobster.

The crab pivoted, keeping his claws aimed at me as I circled for a better grabbing position. An all-out frontal attack would cause unbearable pain to both of us, so I decided to use deceptive tactics and offered the blade of my diving knife to one of his claws. Then as he quickly grabbed the blade, I grabbed the rear of his shell. Into the bag he went, on top of the Pismo clams. You guessed it; the menu that evening included clam chowder and crab legs.

Most fast moving animals of the sea will scatter in all directions or hide as a diver approaches, but not the clawed fighters of the sea. Most crabs, when approached, will rear up on their hind legs ready to do battle. The gesture is largely a bluff if the crab is small. If hard pressed, they will run for cover. He who runs away will live to fight another day.

Fortunately for the hungry diver, the large crabs usually will stay and fight. These crabs move slowly, but their long, agile legs and fast moving claws provide them with a good defense. Large crabs have a frightening appearance under water, and their defense is painfully effective. Their major philosophy seems to be: He who scares his opponent away won't have to run today.

When the sun goes down, crabs come out of their hiding places ready to take over the underwater world, and night diving will produce a good catch for the table. A rock crab will stalk about at night with an omnipotent attitude as if he were the Great Mogul of the immediate vicinity, then predatory man happens along.

Day or night, the little blue crab of the Chesapeake is alert, aggressive, and hot-headed. If you grab for him, his fast



A dinner of Crab Imperial, complete with vegetable garnishes, is enough to tempt even the most recalcitrant guest. This arrangement is not only tasty, it also looks great on your table.



claws will come up to meet your fingers. He is so fast that he can catch small fish. He will sometimes run a short distance, turn and rear back on his heels, raise his head under flailing claws, and threaten to tear you limb from limb. But he knows when to quit and will take off in a cloud of dust if you press the attack.

EDIBLE CRABS

Although all of the crabs in North American waters are edible, some are better eating and more abundant than others. The important crabs taken from these waters are the blue crab, market crab (Dungeness), rock crab, and king crab. There are other species of local importance, but all a diver needs to know about types of crabs is explained in the following paragraph taken from the book, "The Edible Sea."

"The important consideration in crab grabbing is not so much the type of crab as is the size and shape. Large crabs with big, heavy legs and claws provide the most meat. Crabs with thin, short legs and small claws usually render so little meat that they are hardly worth the effort. There is no point in grabbing a little crab that is built like a pile of sticks and expect to get a meal from it. Some species of crabs, however, are so small (as the pea crab) that the whole crab is edible without any cleaning, but it takes several handfuls to make one good meal."

BLUE CRABS (*Callinectes sapidus*)

About three-fourths of all the crabs marketed in this country are blue crabs. Blue crabs are taken on the Atlantic coast in brackish waters from Cape Cod to Florida and along the Gulf of Mexico, being most abundant in the Chesapeake and Delaware Bay areas. Usually, they will be buried up to the top of their shells in muddy or sandy bottoms.

The adult blue usually averages around six inches across the carapace. This beautiful crab has a green shell, blue legs, white underside, and streaks of red



along the teeth of the claws. The back legs are equipped with efficient paddle-shaped swim fins.

The little swimming crab of San Diego is closely related to the blue crab of the Atlantic. This crab is only three inches wide across the shell, but it has enormous front legs and fast, powerful claws. Another crab closely related to the East Coast blue is the Gulf blue crab found along the Gulf of California in brackish water. It is as large as the eastern blue crab with the same bright blue claws and legs.

To catch the swift little blue crab, you must grab quickly from behind to avoid the sharp pinchers, before he skitters away. If you aren't fast enough to catch blue crabs — you have another chance. There are other methods of catching crabs besides going into direct combat with them. The simplest method is the baited line. Tie a piece of fish, clam, or other such bait to the end of a line and add a lead sinker. Lower the line until the bait rests on the bottom. Then, when you feel a tug on the line, you know you have a crab, and you can pull it carefully to the surface, quickly sliding a net under the crab to lift it out.

MARKET CRABS (*Cancer magister*)

This is crab commonly found in markets and on the menus of restaurants throughout the United States. Market crabs are also known as Dungeness or edible crabs. They are usually found on sandy bottoms off the Pacific coast from Alaska to Mexico, but are not abundant nor important commercially south of Monterey Bay, California.

The market crab is large (about seven inches), reddish brown, has hair on his chest, and two horns — one protruding at each end of the shell. The horns look and feel like rosebush thorns, and jut out much further than 18 other smaller horns along the front edge of the shell.

You've got to be fast to catch the market crab without getting your fingers nipped. Like the blue crab, he is fast enough to catch small fish. Once you've got him, you'll have a tiger by the tail.

Most of the commercial crab fisheries use hoop nets or ring nets. The nets are up to three feet in diameter and shaped like a deep dish. The netting is coarse and allows small crabs to escape. Small fish, used as bait are fastened to the bottom of the net and protected by wire netting. The trap is lowered to the bottom and fastened to a float. After about half an hour, the net is hauled up rapidly so the crabs will not have time to escape.

ROCK CRABS (*Cancer*)

Eight species of rock crabs of the cancer genus inhabit the Pacific coast from Alaska to Lower California. They seldom appear in markets because of the difficulty of catching them in commercial quantities. On the Atlantic coast, there are two important species best known in the New England states. They range from Labrador to Cape Hatteras but are seldom found south of Long Island.

The rock crabs are somewhat smaller than their close relative, the market crab, but are just as tasty. Their colors vary from tan to red and their shells are similar in shape to the market crab.



Many crabs can be found on and around pilings of many piers, especially in protected areas. The trick is to be there when there are no fishermen to snag you. The rock crab has large, powerful claws and requires some respect.

ALASKA KING CRABS

The West Coast boasts the huge, succulent, tastiest crab of all, the king crab of northern and Alaskan areas. They are one of Alaska's most important fishing products. The king crab is a member of the spider crab family and is the largest of the crustacea. It is not related to the horseshoe crab, which is also referred to as "king crab" in some areas.

These big crabs measure from six feet to as much as 12 feet across including the extended legs. The Japanese spider crab is very large also. Crabs have been caught that measure 20 feet across from tip to tip of the first pair of legs. The claws are small in proportion to the body and neither one is a crusher claw.

The king crab is easier for the diver to catch during the mating season. The mating urge draws king crabs into the shallows in the spring. Males come first, molting along the way, followed by the females. Molting must precede fertilization of female crabs, but males do not have to

molt to breed. After mating, they return to deeper water.

During the mating process, an amorous male king crab will delicately grasp a female's front legs with his strong claws and remain with her through her premolt and molt periods. In fact, he gallantly helps her out of her old shell, then inverts her soft body beneath his and releases spermatophore bands into her flexed-open abdomen.

This tender and sensuous mating contradicts the promiscuous and pugnacious character of friend crab. But he reverts back to character after his appetite is whetted; he leaves his love to fend for herself and seeks another, and another. A study made by the Alaska Department of Fish & Game showed that one male is able to fertilize five females in a single season.

SOFT-SHELLED CRABS

Soft-shelled crabs are not a species nor even necessarily young crabs. This term refers to a crab just after it has shed its shell while molting. Most soft-shelled crabs sold commercially are blue crabs.

The soft-shelled crab is a great delicacy, and you can eat the whole thing after a little cleaning. The white soft-shell contains high quality proteins and important minerals — and it tastes good.

A molting crab is not easy to find for the diver or fisherman. It is usually a matter of chance to bag a molting crab. In order to have a good supply of the soft-shells, some commercial fisheries use pens to hold crabs that are just beginning to molt. This condition is noted by the fact

that the carapace is beginning to separate between the two back swimming legs. The crabs are kept in penned areas of the ocean until the shells come off, then sold as soft-shells.

SEX

If you intend to catch and eat crabs, it is important to know the difference between the males and females. Female crab meat is a little more succulent because of the higher fat content. Knowing the difference is also important to the game warden, for it is illegal to take female crabs in some states.

The shape of the tail is the key to the sex. Crabs actually do have tails that bend under and snugly fit against their abdomens, forming a V-shape. On males, the tail forms a sharp, narrow V, while on the female it is almost U-shaped and very broad.

During spawning, the female places her eggs between her abdomen and the wide tail. The eggs look similar to an orange colored sponge-like growth under the tail.

HANDLING AFTER CATCHING

After you have captured your crabs, keep them as cool as possible. Put them in a wet burlap bag, in sea weed, or on ice to prolong their lives. A crab that dies should be eaten as soon as possible that same day and should not be frozen for future use. Crabs start to spoil after they die, just as lobsters do.

Some crabs will die quickly in the hot sun. When a crab dies, the digestive acids of the stomach and intestines start to

seep into the body meat and will accelerate spoilage.

CRAB COOKERY

Crab cookery is not related specifically to species, but varies in most cases only in accordance with the size of the crab. It is rather a static subject, for most crabs have delicious meat that can be used in any crab recipe. One exception is a recipe for soft-shelled crabs, which are merely fried or broiled and eaten just as they are, soft shell and all. With crabs, it's more a matter of which recipe you prefer at a given time and not which species you have on hand.

Due to the fact that most recipes call for crab meat, the first procedure is to boil and clean the crabs. The following procedures and recipes are an adaptation of the book *The Edible Sea*. For more crab recipes than presented here, and for catching and preparing other seafoods, get a copy of *The Edible Sea* at a dive store or book store. If you can't find the book, you can order it from Educational Services, P. O. Box 15145, Long Beach, California 90815.

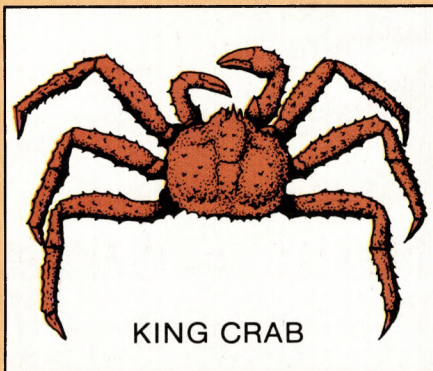
BOILING AND CLEANING CRABS

For recipes that call for crab meat, use this procedure: Crabs should be boiled alive to assure freshness. Plunge crabs into boiling, salted water. Use one tablespoon of salt to each quart of water, or use sea water. Boil or steam for 15 minutes. You may want to add some vinegar and spice, or beer, if you prefer. The beer will not do much to improve the crabs, and it will reduce your supply.

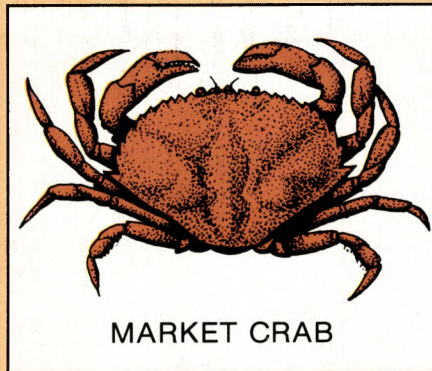


JACK LA PENTA

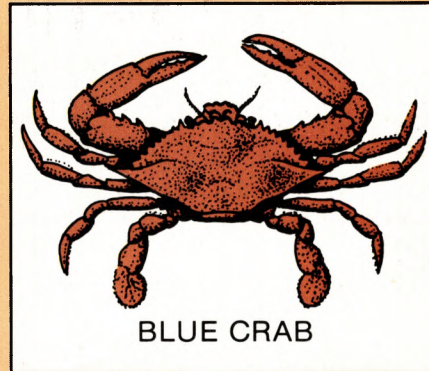
The California rock crab (opposite page) is a fiesty relative of the market crab. With his back to a rock and claws at the ready, any crab can be a tricky target for the diver. The inset photo (opposite page) shows the difference in tail width of the female, left, and the male at right. To prepare crab meat you must first separate the shell from the body (upper left) and remove the tail. Next, break the legs from the body (middle). Large legs can be broiled with butter to make a delicious appetizer. The implements you'll need, a nutpick, hammer, and nimble fingers, are shown at right with the meat separated in bowls. Body meat is at left, leg and claw meat in the center, and crab roe is at right. The meat remaining inside the shell is also roe.



KING CRAB



MARKET CRAB



BLUE CRAB

However, by adding the beer, you will impress your guests, and relax the crabs. After boiling, dump the water (or beer) and cool the crabs with running water. Do not let them soak.

To remove the meat from boiled crabs, break off the claws, legs, and tail. Lift off the top shell at the posterior end. Remove spongy substance (gills), stomach, and intestines and wash the body cavity. Save the soft crab butter (tomalley, or liver). All of the pure white meat left is the goal; use a nutpick to remove it. Crack the claws and legs with a hammer, nutcracker, lobster cracker, or pliers and remove the big pieces of meat. If you have a female, you will sometimes find a bright orange material in the body cavity. This is unfertilized roe and is also good eating. Use or refrigerate crab meat right after cleaning to prevent contamination.

USE OF CRAB MEAT

Crab meat can be used in salads, seafood cocktails, creamed crab dishes, crab balls, patties, fried crab cakes, soups, the list is endless. Considering its excellent flavor, crab lends itself to your own recipe inventions with little chance for failure. Some hints, however, may aid you in devising your own concoctions:

1. Crab meat is very good with cheddar or jack cheese.
2. Nuts of any kind are very chummy with crab meat, and crushed nuts can be added to deviled crab, sprinkled on crab salads, or used as a coating for fried soft-shells.
3. Since crab must be cooked once to remove the meat from the shell, it is wise to be wary of overcooking the meat in the final recipe. Put meat in last and cook just long enough to heat through.
4. Dampening your hands will prevent crab cakes or patties from sticking to them during the shaping process.

BOILED CRAB DINNER

You will need:

- 24 live, hard-shelled crabs for 6 servings
- 6 quarts boiling, salted water, or sea water

Make this a very informal dinner or beach party. Guests will make a fun mess, so make it easy on yourself. Have the big pot of water boiling when the crabs are brought in live, washed, and ready for cooking. Drop the crabs into the pot, cover, and let the water return to a boil, then simmer for 15 minutes. Drain and serve heaped on a large platter. Supply each guest with a large bib, nutcracker, nut picks, and individual servings of melted butter. Corn on the cob, french fries, baked potatoes, and a good green salad are all great accompaniments.

Instead of cracking each crab, try cutting crosswise in several places along the body and at intervals along the legs. After cutting, put the crab back together on the guest's plate; a presentable dish that affords easy removal of crab meat. This may not be as romantic as wrestling with an uncut crab, but is a lot less trouble.

BROILED KING CRAB LEGS

If you're lucky enough to come up with a king crab or another species of very

large crab, remove the legs and slit the backs of them. Spread the shell apart to expose the meat. Spread the meat with lots of butter and place the legs on a preheated broiler about six inches from the heat source. Broil 10 minutes or until the meat is thoroughly heated.

BAKED CRAB IMPERIAL

The state of Maryland claims this one as its own and it is the queen of crab dishes. Though the famous Chesapeake blue crab is used in Maryland for this recipe, we have found it to be just as effective made with any kind of crab meat.

You will need:

- 1 pound crab meat, chunked
- 2 tablespoons chopped onion
- 2 tablespoons chopped green (bell) pepper
- 3 tablespoons butter, melted
- 2 tablespoons flour
- $\frac{1}{2}$ cup milk
- $\frac{1}{2}$ teaspoon salt
- $\frac{1}{4}$ teaspoon Worcestershire sauce
- 2 boiled eggs (5 min.), chopped

Remove any cartilage from crab meat. Saute the onion and green pepper in butter until tender. Blend in the flour, then add milk gradually and cook until thick, stirring constantly. Add seasonings, eggs, and crab meat and mix. Bake in six well greased crab, clam, or scallop shells, or use large individual baking cups. Bake 20 minutes at 350° until brown.

SOFT-SHELLED SANDWICHES

1. Clean crabs. Use a sharp knife and slice off tip of head to remove eyes. Then cut out stomach — a soft pouch just behind the eyes and a little below them. Cut along the carapace on each side, fold back top skin, and remove spongy gills under the back. Allow 2 small or 1 large crab per serving.
2. Saute whole soft-shell crab in butter, turn and brown until done.
3. Eat as is. Makes a good dinner with French bread and salad. For sandwiches, place crabs on buttered bread and lettuce and let the legs hang out.



Photo courtesy of Alaska King Crab Marketing and Quality Control Board

The king crab is the largest of the crustacean family and many that measure 12 feet from leg tip to leg tip have been found. Although the king crab lacks a crusher claw, the claws are quite large and of excellent flavor as are the legs. Spider crabs, a close relative of the king crab, are known to grow to be 20 feet from leg tip to leg tip.

BIMINI

continued from page 17

surface, and plunges down to a white path of sand at 80 to 90 feet. The walls of the crevices are undercut with hundreds of large shelves and caves, many of which can be transversed with ease. Game fish and lobster are plentiful along these reefs as they are not much frequented by divers and fishermen. To appreciate the true beauty of the area you should carry a strong underwater light to bring out the hidden colors of the sea growth that encases the walls and ceilings of the caverns.

Captain Tom Guarino, who normally runs his 31 foot *Baja* out of Key Largo, Florida makes several scheduled trips to Bimini each year. Tom arranges his charters for small groups, usually five to six divers. His fast dive boat is capable of covering large areas of the Bimini and Cat Key waters in a single day. Tom is a seasoned dive master who takes great pride in providing exciting and pleasant diving for his customers. He also gives you a full day of diving which includes four to five tanks of air for maximum bottom time. If you enjoy small groups and a lot of time underwater, he will keep you happy and wet.

Also operating the Bimini area is Skeet LaChance's Adventure Cruises. Skeet manages one of the best and most popular diving operations in the business. Though he has been diving Bimini for the past 18 years, he never tires of abundant good diving available; he has found 41 different locations, including 18 wrecks, that he describes as spectacular. They include a blue hole near south Cat Key that he has thoroughly explored and marked with permanent safety lines, and a location on the Bimini wall that comes within 60 feet of the surface, providing spectacular wall diving at an accessible depth. Skeet's charters leave from Ft. Lauderdale on his 60 foot twin diesel dive boat. The divers live on board during the cruise, sharing four air conditioned staterooms. His three-man crew provides good food, lots of fun, and excellent diving.

If you want a maximum of underwater excitement and beauty during vacation, Bimini could be your spot. With an abundance of coral and marine life, friendly people, reasonable prices, walls, wrecks, blue holes, and three of the best diving charters available, you would be hard put to find so much good diving for such a good price anywhere.

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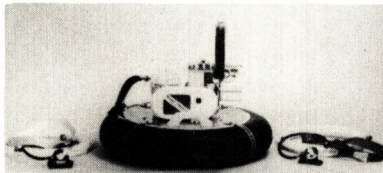
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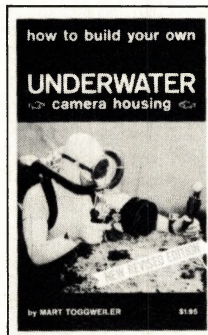
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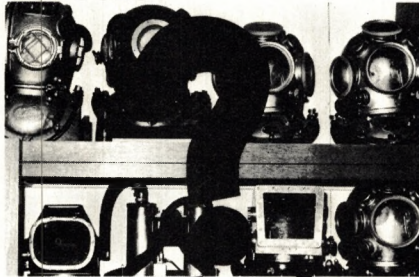
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for your next tank inspection

Tip

We'll bet you didn't know that Federal regulations require a series of specific tests when your tank is visually inspected. Or that the inspectors and the test facility must be registered with the DOT in order to even perform the tests. Or that the inspector has to keep records and mark your tank in a prescribed way. Did you know all that? We didn't think so.

Tip

did you know that SSI has a Tank Inspection Program that meets all Federal requirements, and that our inspectors are registered and trained to perform the required tests? They also provide you with a written record of test results and mark your tank according to standards. It's true and not only that, but we believe we're the only ones who do.

Tip

SSI has a brochure that tells all about the how and the why of visual inspection and it's free for the asking. If you would like to know if you're getting a legitimate inspection, just send us a stamped, self-addressed envelope and we will send you the information. Or better yet, drop in at a SSI member store and pick one up.

scuba schools international

Instructor Notes

by Bret Gilliam



Richard H. Stewart

advance what everything will cost and try to confirm your reservations *in advance* with a daily or weekly rate for the exact services you want. If you don't want the meal plan, don't buy it. If you only want one dive per day, make that clear.

How to Prepare Yourself for Resort Diving

Every diver wants to travel to those great spots he's been reading about in the magazines; to experience the clear water, black coral forests, white sand beaches, and good night life. With the expansion of air service and resort facilities, today's diver can pretty much pick his destination, pack his gear bag and go! But there is a little more to it, or at least there should be.

Picking a dive resort and getting yourself ready require a fair degree of advance planning and homework if your vacation is to be successful.

First decide where you want to go. The diving magazines are an excellent source of descriptions, advertisements, and addresses, and they print reviews of various resort areas and operations. This is a good place to start. Make direct contact with the resort you have in mind, and get all the information you can about their facilities, boats, guides, accommodations and such. Find out *in*

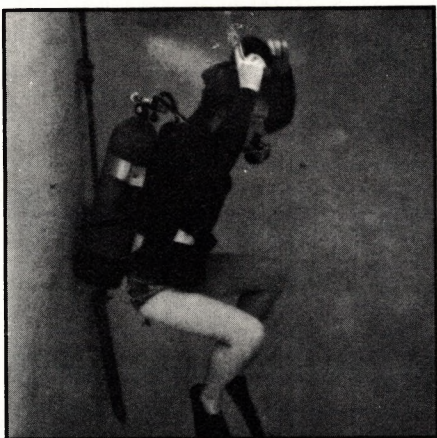
Most travel agents don't have enough experience with diving vacations to be able to give you the technical information you need: can I get my 3000 psi tank filled? can my film be developed overnight? should I bring my own backpack? Get this information yourself and let the travel agent handle flight arrangements and maybe the hotel. There are a few good travel agencies, such as See & Sea Travel of San Francisco, which specialize in diving vacations. These agencies know all about their resorts, have personally inspected them, and are sometimes the resorts' exclusive representatives. You can rely on them to handle all your arrangements.

The total cost of your vacation is very important. Don't let advertising fool you, know the cost in advance in black and white. Many times package plans offering unlimited diving can be inexpensive when considered on a per day basis, and if you're an active diver who wants to get in three or four dives a day the package can be an excellent value. However, if you'd rather take it easy and maybe do one or two dives per day, consider buying on a per tank basis.

If possible, get references on the resort you've selected. Find out if the 200 foot visibility is really there. Are the meals good? Is the staff professionally trained and reliable? Do the tours leave on time? Check with someone who's been there. A lot of shady diving operations look pretty good in their advertisements, but they can be godawful when you arrive.

So much for travel arrangements and choosing the resort. Now let's talk about getting you ready!

One of the most frequent mistakes divers make is overrating their experience level. Be honest with the guide, talk with him about your ability and interests, preferably well in advance. Don't be ashamed to let him know you just completed certification class, or that you've never even seen water deeper than the 60-foot quarry back home. Most of the instructor/guides in the resort areas are top-knotch professionals, and are accustomed to dealing with divers at all levels of experience. With a little advance notice most guides can plan a trip which caters to the novice, yet involves no sacrifice of dignity by the visitor. For the experienced diver with special interests; let the resort know in advance that you'd like to expose at least three rolls of film each day, or that you want to dive the best shelling sites. The good resorts can accommodate special interests with no hassle or busted schedules.



Richard H. Stewart



Picking a dive resort and getting yourself ready require advance planning if your vacation is to be successful.

Bring your log book and certification card along and offer them to your guide on the first day. Get him to sign off your dives with you (for accuracy and verification). It's always a relief to the resort guide when a diver arrives with a well-kept log book. At a glance, the guide can gauge his experience and past diving activities, and the log leaves nothing to speculation. If you haven't kept a log book, start one.

At each resort the equipment requirements will vary. Normally guests are asked to bring as much of their own personal gear as possible, excluding tank and lead weights. Whatever you don't have is usually supplied, but some divers like to use their own gear, including their own backpack or BCP.

Here's a quick rundown of the gear you should bring: the usual mask, fins, snorkel, knife, and depth gauge. Of particular importance is a functional buoyancy compensator, either the vest type or the back-inflated model. These bc's should be equipped with low pressure inflators or compressed air bottles. You need safe and reliable buoyancy control if you're going to dive those drop-off walls.

Make sure your regulator has a checkup and is in good working order.

Make sure it's equipped with a submersible pressure gauge; most guides won't allow you to dive without one.

Even in 80 degree waters, a light wet suit top is welcome, especially on night dives. A full $\frac{1}{8}$ ", one piece suit is good for both warmth and protection against coral cuts. The water ski tunics with short sleeves and beaver tails are also in wide use, but do bring a suit, by the time you make the second dive of the day you'll appreciate the extra warmth.

Be sure to bring a "contingency kit" for all those little things that can break and may not be available at your dive site: extra mask and fin straps, extra mask, a bulb for your light, O-rings for your camera or scuba gear, silicone grease, snorkel keeper, et cetera. Most of these items will fit easily into something like SCUBAPRO's pressure case, and will stow in the bottom of your gear bag until needed. Traveling photographers should carry an extra electrical connector and batteries for their strobes. Many top diving operations have large and well stocked dive stores that carry these items, but some of the smaller and more remote resorts have limited inventories.

Unless you have been diving a lot prior to your trip, you may find a full day of

diving pretty tiring at first, so don't push yourself too hard initially. Take it easy, enjoy yourself and let your body adjust to this new exertion. Also be careful not to overexpose yourself to the sun the first few days. Build up your tan gradually. Nothing can ruin a vacation faster than a painful sunburn. Follow the locals' advice when in doubt.

You will probably be doing a fair amount of repetitive diving, so brush up on working the dive tables to insure that all your dives are no decompression excursions. All divers should travel with a decompression meter as a back-up system, and be sure that it's carried in a pressure case while flying to avoid damage or a change in calibration. Never attempt deep diving without the counsel and supervision of a trained instructor/guide. Several resorts now offer programs in deep diving techniques that are excellent and safe. If you want to dive deeper than 130 feet, enroll in these specialty courses. You'll receive proper training in the essentials of decompression theory, equipment systems, emergency procedures, and dive planning. Deep diving is nothing to fool around with, so stick with an experienced professional!

Wherever you go, remember to have a good time and go back again!

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RELEASES

continued from page 18

scuba group based in the Boston area, the goal of the conference is to promote diving among women and to provide women (and men) already involved in the sport with new information on a variety of topics including: female anatomy and physiology as it relates to diving, professional diving for women, a women divers' lobby, or how to convince the manufacturers to design gear for smaller people, male divers' attitudes toward female divers, and physical fitness for women divers.

"Women and Diving" is the most ambitious event Aquawomen has sponsored thus far. The group was formed 18 months ago as an outgrowth of the "First Annual All-Women's Dive" held at Folly Cove in Rockport, Massachusetts, in July, 1976. That event drew dozens of women to this favorite New England dive site, many of whom expressed an interest in forming a more permanent organization. Aquawomen has since grown to include about fifty members, many of whom will be involved in the planning and execution of the February conference. The group provides a forum for women who want to talk about their diving experiences combined with more formal instruction (provided by group members) on a variety of diving-related topics such as gear care, CPR, and ear physiology to name a few.

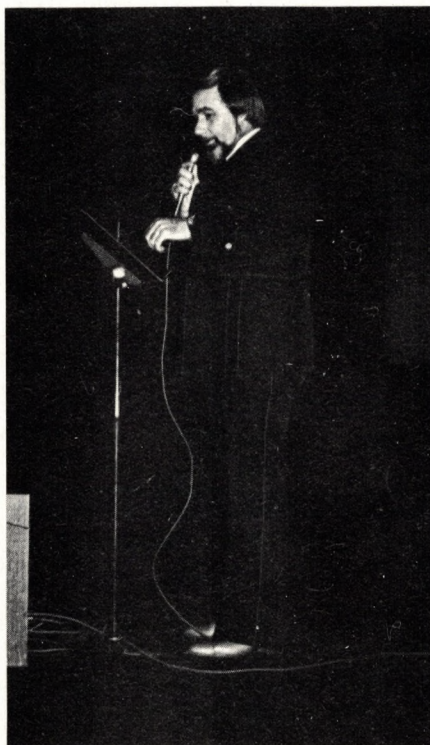
Admission will be \$5 and registration will begin at 8:30 am. For more information about the conference, contact Valerie Costelloe, c/o East Coast Divers, 213 Boylston St., Brookline, Mass. 02146. Telephone: (617) 227-2216.

Denver Film Festival

Denver, Colorado was the scene of a very successful underwater film festival last November. Paul Tzimoulis, editor/publisher of *Skin Diver* Magazine, acted as master of ceremonies for the program which included *See* by Robin Lehman, twice winner of Hollywood Academy awards; *I Am The Sea*, by Ozzie Wissell, past president of the San Diego Underwater Photographic Society; and *Fire Under The Sea*, an unbelievable film of man's first underwater observations of lava flows.

Underwater photographer Harry Wadsworth of Denver, presented his version of a *Red Sea Odyssey*, and Paul Tzimoulis showed his *Fish Feeding*, a humorous 20 minute presentation on fish behavior. Most unusual and unique was the fast pace, 7-minute art film by Hollywood film producer Dave Adams,

Sport Diver



Paul Tzimoulis, master of ceremonies at the festival.

entitled *Deep Blue World*. The film is a composite of over 1,000 underwater photographs by a half dozen of the U.S.'s foremost still photographers. The highlight of the two-day program was a showing of the classic 12 minute Jacques Cousteau film, *Cousteau Wreck Dive*. Filmed in black and white sometime in 1947, the film is an excellent example of the early days of diving and the mystique that surrounded divers some 30 years ago.

The festival was sponsored by the Rocky Mountain Diving Center of Denver, and the program was quite successful. We hope to see more of this type of expression of the serious intent of divers in this area.

Hyperbaric Oxygen Therapy

A new book, *Hyperbaric Oxygen Therapy*, is an outgrowth of a workshop on the subject held at the University of California Medical Center, San Francisco in October, 1975. The 24 chapters deal with the fundamentals, currently accepted indications, new directions, and controversial applications of hyperbaric oxygen therapy. Cost is \$25.00 for members of the Undersea Medical Society, \$35.00 for non-members. Order from: Undersea Medical Society, Inc., 9650 Rockville Pike, Bethesda, Maryland, 20014.

Underwater Medicine

"Underwater Medicine and Related Sciences, A Guide to the Literature, Vol. 3, 1977" is now available from the Undersea Medical Society. The guide

provides nearly 1900 informative abstracts, with complete bibliographic data, mainly from literature published in 1974 and 1975. A key word rotated subject index, based on a specially structured 370 word microthesaurus, enables users to locate the abstract by subject, and to gather full information on any subject area in the field. The microthesaurus included, as is an author index. Cost is \$25.00 for UMS members, \$35.00 for non-members. Orders should be sent to: Undersea Medical Society, Inc., 9650 Rockville Pike, Bethesda, Maryland, 20014.

Hypothermia-Hyperthermia

The Commercial Diving Center is offering for sale the published proceedings of a seminar on "Thermal Problems in Diving". Participants submitting papers included: Paul Webb, M.D., John Alexander, M.D., Glen Egstrom, Ph.D., Lawrence Raymond, M.D., David Youngblood, M.D., A. R. Behnke, M.D., Robert Bullard, and George Rapp. Topics covered range from "Human Tolerance to Thermal Extremes" to "The Immediate Management of Thermally Unbalanced Casualties in the Field," "The Thermal Environment for Undersea Habitats," "Respiratory Heat Loss," and "Problems of Body Heat Loss in Water Immersion." The proceedings may be ordered from Commercial Diving Center, 272 South Fries Avenue, Wilmington, California 90744. Cost is \$7.00 postpaid.

LETTERS

continued from page 20

Dear Sport Diver,

I placed my subscription by your magazine on the basis of the second issue. I then saw the cover of the first issue and am incensed! After reading the two letters to the editor complaining about the same cover and saw your responses to them, I am furious!

You may can all of the B.S. regarding aesthetics, photography, and back-up safety crews and BCs — your pictures of Ms. Gains are pure unadulterated and unjustifiable female sexploitation. We have heard all the rationalizations before — don't bother to repeat them. Because I am an avid diver, I will give your magazine another chance to see the light and repent. If you persist in demeaning me and my sex for profit I shall do what I can to combat it — I shall cancel!

Sally Dilger
Cincinnati, Ohio

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REVIEWS

Underwater with the Nikonos and Nikon Systems

Author: Herb Taylor, Published by Amphoto, 1977, 160 pages, \$9.95, Hardbound

Mr. Taylor has written an excellent book detailing the operational characteristics of the Nikonos and Nikon cameras, problems associated with underwater photography, comparative studies of accessory equipment, and maintenance. The book is well organized and nicely illustrated with many photos, including 17 color shots.

As a guidebook for the amateur, *Underwater* . . . is very thorough, moving patiently and clearly through a mass of information on the gear, exposure, lenses, test procedures, flash lighting, strobes and such.

As a reference for the experienced or professional, *Underwater* . . . contains much useful information on lens element configurations for the various Nikkor and other lenses available for the Nikonos, depth of field data for the various lenses both in air and water, comparisons, photos, and descriptions of most of the better underwater strobes, and comparisons of the various underwater housings for in-air Nikons.

There are sections dealing with routine maintenance, precautionary treatment for both the Nikonos and underwater housings, carrying cases, and how to cope with flooded equipment.

Underwater with the Nikonos and Nikon Systems is a good source of concise, clearly stated, detailed information.

Fishwatcher's Guide to the Inshore Fishes of the Pacific Coast

Author: Daniel Gotshall, Published by Sea Challengers, 1977, 108 pages, Paperbound

This is a beautiful handbook listing the common fish of the California coast. Daniel Gotshall has been a marine biologist with the California Department of Fish and Game for over 20 years, and has had ample time to gather the information for his guide. There are several pages of drawings to help the watcher identify the family of a given specimen, and 93 very nice color photos of individual specimens. These are numbered and each has a descriptive paragraph giving its scientific name, English translation of the Latin, and its common name, as well as its habits, its home, and unusual characteristics. No

matter if you've encountered a Sarcastic Fringehead or a Monkeyface Eel, the *Fishwatcher's Guide* can help you track down and identify it.

Amphibian: The Adventures of a Professional Diver

Author: Jim Gott with Norman L. Smith, Published by Playboy Press, 1976, 204 pages, \$8.95, Hardbound

Jim Gott's *Adventures* . . . is just that, sort of a 'my life and times' account of getting into scuba, the Marines, commercial diving, and instruction, in about that order. The book is well written and very readable, I read it in one sitting. *Amphibian* . . . would probably be most appreciated by the neophyte or "hope to" diver, most instructors and divers have their own stock of fish stories and don't really need anyone else's. Gott's description of his experiences working as a free-lance diver for oil companies in the Gulf is mildly entertaining, but as he admits, he hardly stayed long enough to be considered an expert. Much of the last part of the book is spent going over Gott's career as an instructor for an NASDS shop in New York and expounding his personal theory of scuba instruction. I think probably Playboy would have been better off putting this one in a soft cover and selling to the general public through the newsstands.

The Lobster: Its Life Cycle

Author: Herb Taylor, Published by Sterling Publishing Co., 1975, 80 pages, \$5.95, Hardbound

This selection from the *Colorful Nature Series* describes by words and photographs every stage of development of the lobster *Homarus Americanus*, the true lobster of the U.S. east coast.

The book won honorable mention from the New York Academy of Sciences in the Children's Science Book category, however, anyone interested in the lobster could learn from the book. It not only goes into details of the lobster's habits and habitats, but cites the evidence of declining lobster populations and notes some of the research being done to improve the availability and longevity of this tasty crustacean.

The text is clearly written and set in large type with many very nice color photos to illustrate. Also covered are the near cousins of the American lobster, the spiny lobster, the prawn, and the Spanish

lobster. Altogether *The Lobster* . . . would make an excellent addition to the library of any young biologist.

Red Sea Diver's Guide

Author: Shlomo Cohen, Published by Red Sea Diver's Publications, Ltd., 1975, 182 pages, \$24.95, Hardbound

The *Red Sea Diver's Guide* is a profusely illustrated guidebook to dive sites on the eastern side of the Sinai Peninsula. There are 18 spots which are identified on an area map and described as to depths, bottom conditions, currents, fish life, coral, etc. Included is an aerial view of each dive site with overlay pages marking out suggested dive routes. All the information you'll need is supplied: names, and addresses of air stations, equipment rentals, hotels, airlines, cab companies, and emergency medical personnel. The appendices supply decompression tables, metric-English conversions, rate the hotels comfort-wise, and give names and addresses for the diving clubs and facilities. On the whole, the *Red Sea Diver's Guide* is thorough and well illustrated, and should be considered an imperative before planning a trip to the area.

Foraging Along the California Coast

Author: Peter Howorth, Published by Capra Press, 1977, 192 pages, Paperbound

Peter Howorth's illustrated handbook goes into elaborate detail on the edible plants and marine life along the California coast. The book is divided into three sections: things found from the Mexican border to Point Conception, Point Conception to the Golden Gate, and the Golden Gate to the Oregon border.

The book covers all aspects of catching your own dinner from the sea: where to look, what to look for, descriptions of various types of equipment and its use; the habits, hiding places, and good recipes for whatever you catch. Included are sections on fishing in bays and estuaries, gathering on rocky beaches, deepwater gamefish, the kelp community, gathering running grunion, pier fishing, pole poking, shark harpooning, and spearfishing.

After the description of each type of quarry is a note on the Fish and Game regulations applying to that species.

Throughout the book the author stresses good sportsmanship and good

REVIEWS

conservation practices. The one section that perhaps doesn't quite fit with his declared "environmentalist" stand is the chapter dealing with harpooning sharks for fun. While this may be exciting and a holdover from our early maritime heritage, the taking of non-edible game does seem a little sadistic. Of course, there are plenty of sharks to go around, they are not an endangered species, and they can pose a potential threat, especially around swimming areas.

Howorth's style is straightforward and interesting and the accompanying illustrations done by his wife, Jane Howorth, match this perfectly. Of particular interest to the diver will be the sketches dealing with special spearfishing rigs for use on big gamefish such as the Black Seabass, and the short pole spear Howorth calls "The Paralyzer". On the balance, a well-written and comprehensive guide to filling your freezer without emptying your wallet.

Nikonos Photography—The Camera and the System

Author: Fred M. Roberts, Published by Roberts Enterprises, 1977, 161 pages, \$4.95 Softbound, \$11.95 Hardbound

This is the third edition of Fred Robert's Nikonos system book, updated to include data on the Nikonos III and new connectors and other equipment on the market. The author systematically describes the parts, functions, and operation of the Nikonos, then goes into a lengthy description of the artificial lighting systems available for it. All of this material is well illustrated by diagrams, charts, and photos. Roberts also gives many good tips on producing better underwater photos, like how to shoot in dirty water, and attachments that can improve the operation of the system. Despite some somewhat muddled (for beginners) technical explanations regarding film emulsion characteristics, the book does give many very good suggestions on underwater photo technique and a thorough listing of Nikonos accessories.

NAUI—Professional Resource Organizer

Author: Ted Bohler, Published by NAUI 1977

The National Association of Underwater Instructors has recently made available its new Instructor Manual. The *Professional Resource Organizer* is as complete as any instructional manual previously published. Designed in easy to follow steps, the organizer covers

progressive lectures, pool sessions, and open water skills. In addition NAUI has taken a forward step to provide the instructor with sections concerning methods of instruction, instructor professionalism, the business of diving instruction, and much more. The *NAUI Professional Resource Organizer* is the most complete and informative instructional manual available for those concerned with professional instruction. Available from NAUI, P. O. Box 630, Colton, California 92324.

Easy Diver

Author: Lou Fead, Published by Deepstar Publications, 1977, 175 pages, Softbound

Lou Fead's new book passes on what his articles and lectures have been saying for years: Sport Diving is FUN, and all of our preparation, preplanning, and actions should be aimed at keeping it that way. If your diving is safe, exciting, and comfortable, then you're probably already what Lou likes to see an easy diver. If it's not, then maybe some of his suggestions can help you along. His easy to grasp common sense explanations of buoyancy, boat diving, using a compass, surf entry, and more, deserve a close look by instructors, students, and "serious" divers alike.

It is this common sense and readability that make *Easy Diver* so enjoyable. Lou urges the diver to work with, not against, the forces of nature. Sport diving is not supposed to be a struggle against the elements. If you're making long fins to a dive site and finding yourself tired when you arrive, your diving isn't easy, it's hard work. Lou's point is that, because it's not easy, it's probably not safe either. His motto is: Dive with your brains, not your back.

In aid of simplifying and rendering the dive experience more enjoyable, Lou offers page after page of useful information on surf entries, currents, locating and bringing up lost objects, emergency procedures, and first aid. All of this is clarified and illustrated by Ted Bohler's photographs and Mary Winton's sketches.

Easy Diver is an excellent source of information and inspiration, and as such would be a particularly good addition to the reading list of any instructor's course.

141 Dives

Author: Betty Pratt-Johnson, Published by Gordon Soules Economic and Marketing Research (Canada) and The Writing Works (U.S.A.), 1976, 392 pages, \$11.95, Softbound

141 Dives in the Protected Waters of Washington and British Columbia is a guide to diving in the Pacific Northwest.

For each of the dive sites included the text notes the skills required: water depth, shore or boat access, how to get there, hazards, current and tide conditions, nautical charts, and photographic potential. Perhaps of more interest to divers accustomed to more southerly waters, is the section dealing with why one should dive in the Northwest. The water below 40 feet hovers around 45° F. (7° C.) all year. Surface water temperatures fluctuate between 39° F. (4° C.) and 64° F. (18° C.). Yet these cool waters are the home of many fine and colorful marine plants and animals, wrecks, rocks, and swift currents. This is the excitement of Pacific diving; Pratt-Johnson conveys the sense of it well in her introduction and in the "Why Go?" portion of each dive description. The information appears to be thorough, including addresses and phone numbers for air stations and emergency aid. Areas covered by the book are: Vancouver, Indian Arm and Howe Sound, Sechart Peninsula, Powell River and North Campbell River to Kelsey Bay, Nanaimo, Hornby Island, and south Sansum Narrows, Victoria and Saanich Inlet, Southern Gulf Islands, San Juan Islands, Seattle and Puget Sound.

Australia's Ocean of Life

Author: Stephen Parish, Published by Wednes Publications

An excellent photographic portfolio by one of Australia's leading underwater still photographers. The subjects in this book are all portrayed in their natural environment, most located in the cooler waters off southeastern Australia. Detailed pictorially as well as in the text, the nine sections of this publication cover all of the major sea life groups. Most impressive are the 157 full color photographs, the work of nearly six years of photo dives. Parish is well known in Australia as a marine naturalist, photographer, lecturer, and writer, and currently is chairman of the Australian Underwater Federation's photographic advisory panel. Although this is Steve's first book, he is compiling material for several others, dealing with the biology and ecology of Australia's seas.

All materials to be reviewed should be marked to the attention of the Review Editor and submitted to:

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The Florida Skin Diving Association's Tenth Annual Underwater Film Festival will be held at the Gainesville Hilton, Gainesville, Florida, February 24-26, 1978. The theme of this year's festival will be "Treasure Hunting and Denizens of the Deep", and it promises to surpass all previous FSDA Festivals. In addition to social activities and the films, there will be lecture discussions and exhibits. Persons interested in exhibiting or attending should contact **Dr. Howard Suzuki, 4331 N.W. 20th Place, Gainesville, Florida 32605.**

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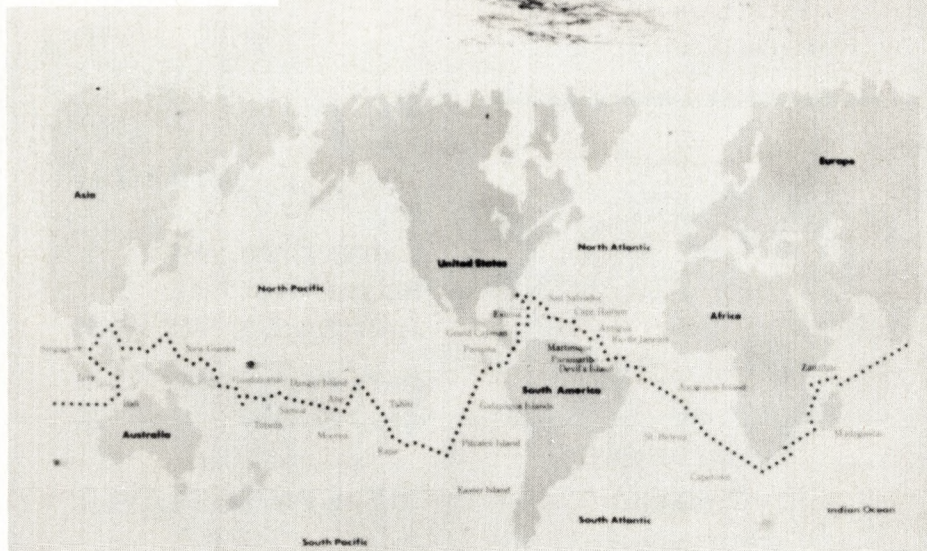
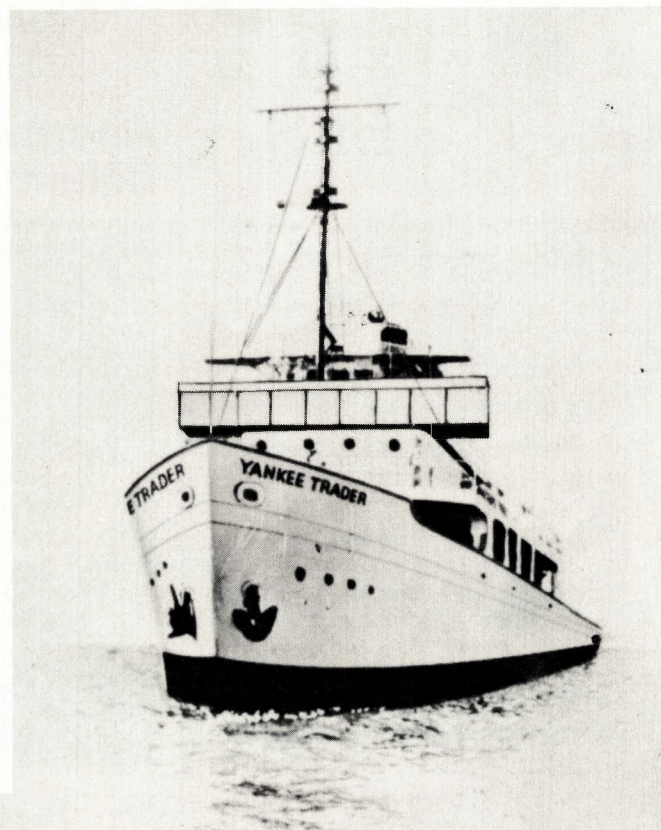
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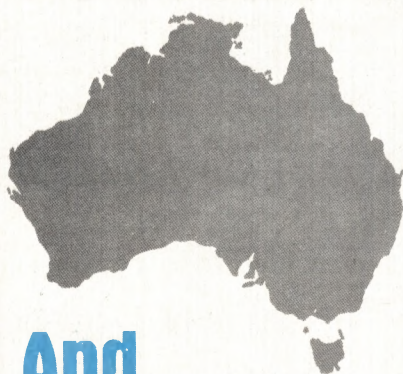
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IN THE NEWS

World File of Marine Biology Started

The GRSTS (Gruppo Ricerche Scientifiche e Tecniche Subacquee/ Scientific Research and Underwater Technique Group) is organizing a World File of Marine Biology. Sponsored by UNESCO (United Nations Educational, Scientific, and Cultural Organization), Ilford, Ltd., and Fondazione Cini, the GRSTS project is seeking donations of color transparencies from underwater photographers.

The GRSTS is looking for 35mm and 2¼x2¼ transparencies that depict a fish, a habitat, or any form of marine life. The photos are for scientific purposes so their color, composition, and aesthetic qualities are secondary. Each transparency submitted will be duplicated and the original and a copy will be sent back to the photographer.

The transparency must be accompanied by the photographer's name and address, the date, place, and depth at which the shot was taken, and some observation on the characteristics of the bottom. A self-addressed, stamped envelope must be enclosed for the return of the transparency.

The GRSTS will publish a catalog of transparencies received and can act as a go-between for photographers and publishers. GRSTS's address is: 4 via Strozzi, 50123 Firenze, Italy.

Harp Seal Kill Quota Increased

Canada has announced an increase in the allowable quota for pelts from harp seal pups. The six per cent increase will raise the maximum number of pups killed to 180,000 next season.

Fisheries Minister Romeo LeBlanc defended the action by saying "Scientists have advised us that the current population of harp seals could sustain a cuth of 227,000 to 245,000."

LeBlanc did not say which scientists had supplied the estimates, but environmentalists around the world have charged that the harp seal is being hunted to extinction.

CIA-Trained Dolphins Sold

A former Navy scientist has testified that government-trained dolphins capable of killing swimmers and carrying weapons were sold to Latin American countries by researchers connected with the Central Intelligence Agency.

Michael Greenwood said that he left his civilian research job with the Navy in

1972 because he disagreed with intelligence operatives over the use of dolphins as biological weapons and their sale to Latin American nations.

Greenwood made his remarks in testimony during the trial of Kenneth Le Vasseur, who was charged with theft after he and Steve Sipman released two dolphins from research tanks at the University of Hawaii in May, 1977.

According to Greenwood, dolphins at the Navy Undersea Center at Kaneohe Bay, Hawaii were trained as "weapons platforms". Research of the same sort was carried on at a CIA marine mammal center in Key West, Florida, where Greenwood worked for a while.

Weapon-carrying dolphins were trained to attack Russian nuclear cruise ships in Havana Harbor, Greenwood claimed in an interview after his testimony. These dolphins were later sold to Latin American countries, either by the CIA or by intelligence workers disenchanted with the CIA, Greenwood said.

Other dolphins were trained to plunge needles conducting high pressure gas into the bodies of enemy swimmers, killing them, according to Greenwood. He said these experiments were carried out at Kaneohe Bay and at Camranh Bay, Vietnam during 1971.

An official CIA spokesman said he had no knowledge of CIA sales of trained dolphins, but said he could not make a firm denial of Greenwood's charges.

Sharp-eyed Sharks

Experiments during the 1940's led scientists to believe that sharks had poor eyesight, but now research done by Dr. Samuel Gruber suggests that they may see ten times better than humans in dim light. Dr. Gruber is conducting an ongoing visual study of sharks at the University of Miami's Rosentiel School of Marine and Atmospheric Science.

Gruber has been doing his research with two to three-foot long lemon sharks. He says the study has shown that sharks can see light too dim to be detected by humans, thus the shark may be well adapted for night hunting. Projects on how well sharks can see and whether they can discern colors will be investigated next.

While a graduate student at the University of Miami, Gruber helped capture and control the sharks used in the James Bond movie "Thunderball", and the producers of "Jaws" consulted him on shark handling techniques.

Diver Equipment Information

Since 1968 Battelle Columbus Laboratories, Columbus, Ohio, has maintained the Diver Equipment Information Center (DEIC). The Center now has 14,000 documents, articles, and books detailing information on scuba and hookah equipment, masks, suits, CO2 scrubbers, regulators, tanks, breathing gases, power tools, instruments, diver performance, PTCs, chambers, habitats, submersibles, SDVs, and communication equipment. Special attention is currently being given to diving equipment and techniques applicable to offshore industry, salvage, and ocean engineering.

The documents contained in DEIC have been abstracted and the Center's files can be searched by clue word, author, or organization. The Center's services include retrospective searches, preparation of bibliographies, state-of-the-art studies, and location of specific documents. A monthly current awareness service is provided to Naval organizations on request and to the general public on a subscription basis through the Undersea Medical Society.

Extensive tasks involving the expenditure of considerable time and effort or tasks that require actual technical analysis can be arranged on a contract basis. The Center prepares a monthly accession list, and a thesaurus of terms included in the clue word files of DEIC is maintained and updated annually. A rapport is maintained with other sources of information in the diving field so requestors whose subject areas are outside the scope of DEIC can be referred to the proper source of information.

Requests for information from DEIC should be addressed to Diver Equipment Information Center, Battelle Columbus Laboratories, 505 King Avenue, Columbus, Ohio 43201.

New Sea Life in the Antarctic

Two types of previously unknown marine animals have been found living in the mud beneath sea ice packs in Antarctica. The one to two-inch tall creatures were found in sub-freezing water 85 to 100 feet below the surface.

According to Dr. Jere Lipps of the University of California at Davis, the animals have no eyes and no mouth. They may feed by trapping plankton in small tentacles, or they may absorb nutrients from the mud they live in. The two types of grayish-brown animals are similar, and resemble trees.

Salty Red Sea

Some 7,000 feet below the surface of the Red Sea are areas that have water

continued page 112

Photography tells the story



And, underwater photography means Nikonos — the only 35mm camera designed for use without a housing at depths to 160 feet (as well as above water).

Here, a diver is using it to secure positive identification of underwater wreckage. Elsewhere, Nikonos-equipped divers are examining off-shore pipe lines, tracing pollution sources, aiding ecological and archaeological studies — each providing the all-important photographic record.

Ruggedly built by Nikon and equipped with famous Nikkor optics for needle-sharp, true-color photographs, the Nikonos III is also surprisingly easy to use. And there's a whole system of Nikonos lenses and accessories to help get you the pictures you need. At Nikon camera dealers and selected dive shops. Or, write for Lit/Pak N-24, Nikon Inc., Garden City, N.Y. 11530. Subsidiary of Ehrenreich Photo-Optical Industries, Inc. (In Canada, Anglophoto Ltd. P.Q.) 

Nikonos III

the amphibious camera from Nikon



Richard H. Stewart

Understanding Underwater Photography



By Richard H. Stewart

Underwater photography, in any stage of advancement, ties up a certain degree of cash. Such investments should not be taken lightly. From the least expensive Instamatic to the highest priced aluminum alloy housing, maintenance is of the utmost importance. Proper care of this equipment is not only critical in reducing maintenance and replacement costs, but also in producing pleasing photographs and minimizing the ever present frustrations of underwater photography.

Most housing and strobe floodings can be attributed to one of two major factors: lack of maintenance or carelessness in preparation. These are the subjects of this article. If the blame is not one then it is the other, and in most cases the finger can justly be pointed at the user of the equipment. Rarely is flooding the direct result of an equipment malfunction.

You would think that anyone willing to spend \$100 to \$1000 for equipment would, at the same time, add the minor expense of obtaining a few cleaning aids and a storage case, yet most amateur underwater photographers do without. Such camera maintenance kits are an absolute necessity, and can be compiled for under \$25.

The best storage for such a kit is a small fishing tackle box. Top on the contents list, of course, are extra Nikonos O-rings. There is nothing worse than, in the middle of a trip, discovering that your O-rings are becoming brittle and cracking, or have been punctured accidentally during removal. O-rings are almost never available at pro dive stores or camera stores, so you should carry plenty. Q-Tip cotton swabs are extremely useful for cleaning narrow O-ring grooves and for

applying silicone in tight spaces. Do not attempt to do any photography without silicone grease. Without proper O-ring lubrication you're inviting flooding. Grease supplied by the photographic manufacturers is adequate, but for those who frequently photograph in warm water, a heavier industrial grade, such as Dow Corning DC-4 silicone is recommended. Avoid using spray silicone, especially around plastic housings. Paper towels should always be handy to dry equipment before reloading. A bottle of pure alcohol should be carried in the event of a flooding. By using alcohol to displace the water in flooded equipment you can get by with an inexpensive repair instead of replacing the gear. For cleaning camera lenses there's no substitute for Kodak's low abrasive lens cleaning fluid and tissue. Do not use eyeglass tissue. A blower brush

Understanding Underwater Photography



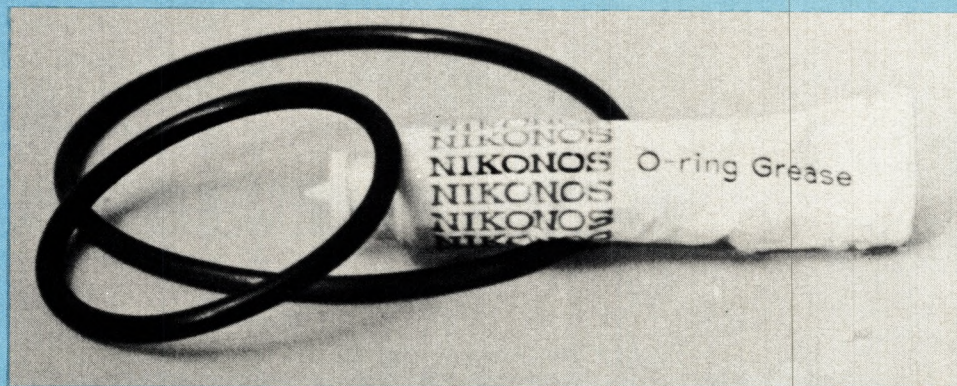
Richard H. Stewart

must be used to clean dust from the lens surface before the cleaning fluid is applied. For the camera body, you'll find most lint-free soft cloths adequate.

So far we have briefly described the most necessary articles that should be carried, even if you're only interested in a few snapshots with an Instamatic and a plastic housing. To be truly prepared then the following should also be considered as part of the standard maintenance kit. WD-

40 is useful for reducing corrosion around the threaded fittings of Oceanic strobe arms, quick release snaps on housings and strobes, and a variety of other metal objects. If your lighting system is designed with EO (Electro Oceanic) connectors, a .22 caliber bore brush is perfect for cleaning the copper contacts inside the female bulkhead. Assorted light tools such as Allen wrenches, a set of small screwdrivers, a crescent wrench, blunt

and needle-nosed pliers are equally important. A couple of utility razors or a pocket knife always seem to come in handy. Extra batteries for camera and strobes can save many headaches. If you're out of the country when your batteries die, you'll discover they're extremely hard to find and up to double the U.S. price. It's well worth the additional trouble and expense to carry extras. Before heading overseas, be sure



to find the proper electrical adaptors and converters if you're going to be using any rechargeable strobes.

Preparation for a photographic dive involves a few "never forget" common sense rules. Never attempt to use equipment that hasn't been thoroughly and properly cleaned after its last use. To do so is a sure invitation for flooding. Make it a regular practice to load and unload your cameras on dry land, above all avoid

loading on small boats. Test your entire system several times before placing it in the water. Be sure O-rings have sealed evenly and that nothing is obstructing the seal, for example a protruding PC cord. When sealing a Nikonos apply even pressure from the top. With housings, lock down opposite snaps simultaneously. Never let your buddy or dive trip operator rush you into the water until you are entirely prepared and all systems,

including your dive gear, are go. Better to get in late than be sorry! The loss will be yours alone. Once you have hit the water peer into the viewfinder, lens port, and strobe dome for early signs of leakage. If you see even the least sign of water, surface, holding the most critical part of the camera upwards, thus allowing the water to be localized in the least destructive area.



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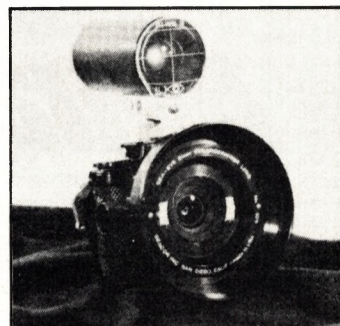
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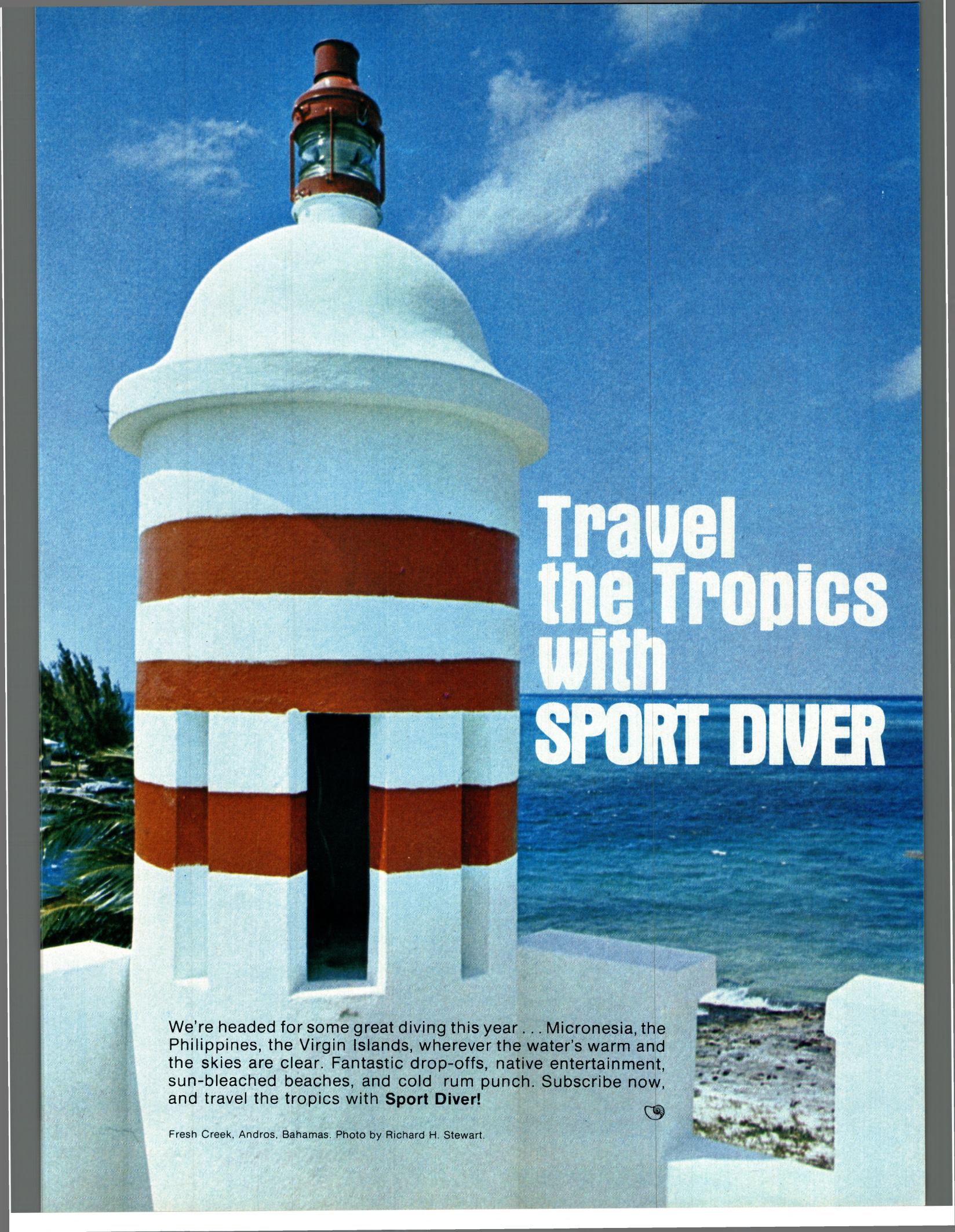
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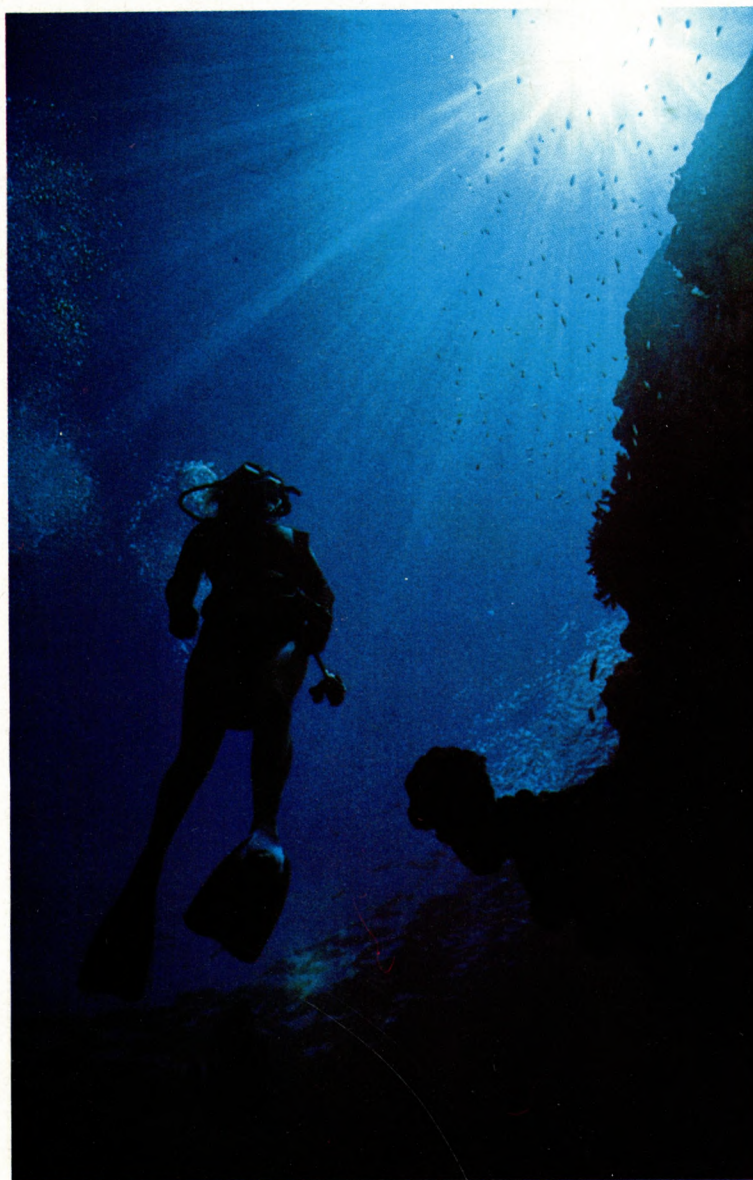


Fresh Creek, Andros, Bahamas. Photo by Richard H. Stewart.

Richard H. Stewart



The Great Barrier Reef stretches for 1200 miles along the tropical coast of northeastern Australia, and is the most extensive coral formation in the world. It is the largest structure ever built by living organisms. For thousands of years Australia was an unknown land, populated by a few stone age tribes. In 1770, Captain James Cook sailed along the northeast coast on his famous voyage of discovery, and claimed the continent for Great Britain. His entry in the journal of the *Endeavor* for Monday, June 11th, 1770, gives his impression of the mightiest of reefs: "A reef such as one speaks of here is scarcely known in Europe. It is a wall



Richard H. Stewart

Once a rugged bit of frontier coastline, Sydney (far left) is now a thriving metropolis and the chief point of entry for most of the international travelers coming to Australia. The small drop-off, just 200 yards from the beach at Heron Island (left), is a spectacular introduction to the Great Barrier Reef. When the tide is at full ebb (right) the top of the reef is exposed, inviting the curious to take a reef walk.

GALLERY

AUSTRALIA

Story by Rick Frehsee
Photographs by Rick Frehsee and Richard Stewart



of coral rising perpendicularly out of the unfathomable ocean."

Despite all the lore of the Great Barrier Reef, there are some persistent misconceptions. While it is truly great, it is not a barrier reef, as that term was classically defined by Charles Darwin. Darwin envisioned a barrier reef to be included in the

evolution of a coral atoll from a fringing reef surrounding a subsiding volcanic island. Neither is it a single reef, or even a series of reefs. Actually it is a rather extraordinary complex of reef and island types. They occur within an area of 200,000 km² (120,000 square miles), mostly in depths

Richard H. Stewart



Rick Frehsee





of 30 meters (98 feet) or less.

As this is the largest assemblage of coral reefs in the world, with an enormous latitudinal range, it supports perhaps the most diverse fish population of any reef complex. The number of species recorded from the reef now exceeds 1,000. If we include the

pelagic fishes and the peripheral fishes in areas adjacent to the reef, this number exceeds 1,500 at present and will possibly exceed 2,000 species in the near future. It is rare for any recent scientific collection made on the reef to return to the laboratory without numerous new fish species. Very few

areas of this enormous complex have been adequately surveyed, and it will be some time before the total fish fauna of the Great Barrier Reef is known.

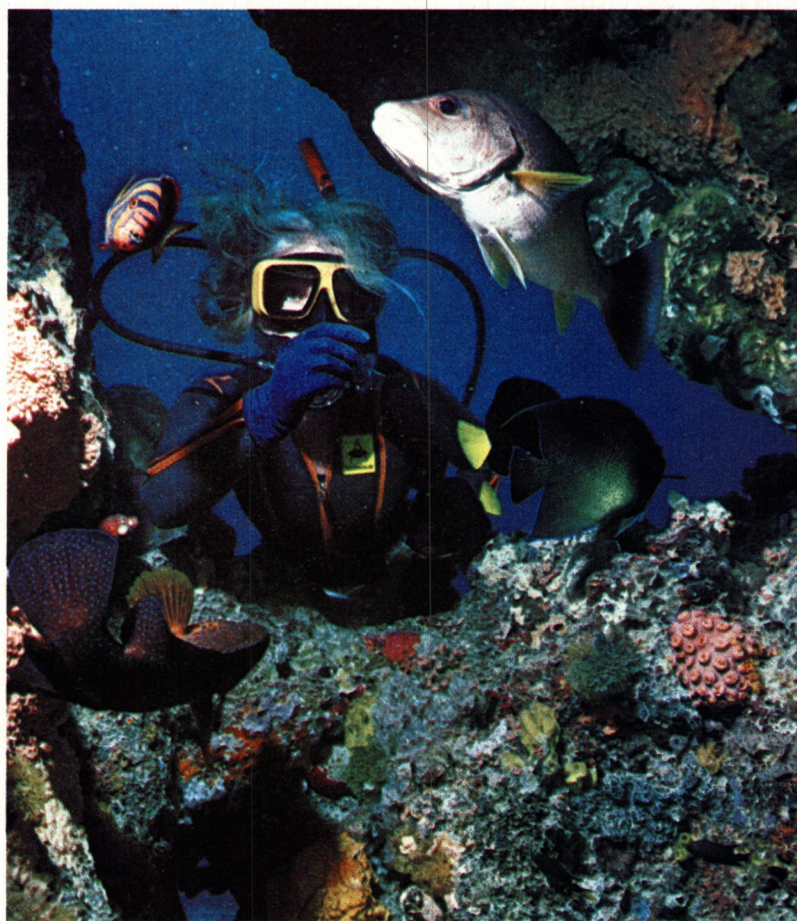
In terms of numbers of species of coral the Great Barrier Reef is very rich. There are about 80 genera and sub-genera, and approximately 350



Richard H. Stewart

Australia's national airline, Qantas, maintains extensive national and international flights, assuring the traveler easy access and convenient scheduling. The service aboard Qantas flights is superb, the flight crews friendly and attentive. Heron Island (middle) appears as a dark green patch among the bright blue waters surrounding the Great Barrier Reef. The Heli-Trans air taxi makes the run from Gladstone to Heron Island. This protected marine sanctuary is a showcase for the aquatic life of the Reef.

Richard H. Stewart



Richard H. Stewart



species, three times the number found in the Caribbean. Corals are not the only organisms important in reef formation. The individual coral colonies are cemented together into a rigid structure by the deposit of carbonates by various marine algae. One can think of the corals as forming the building blocks of the reef and the calcareous algae as providing the cement.

There are a large number

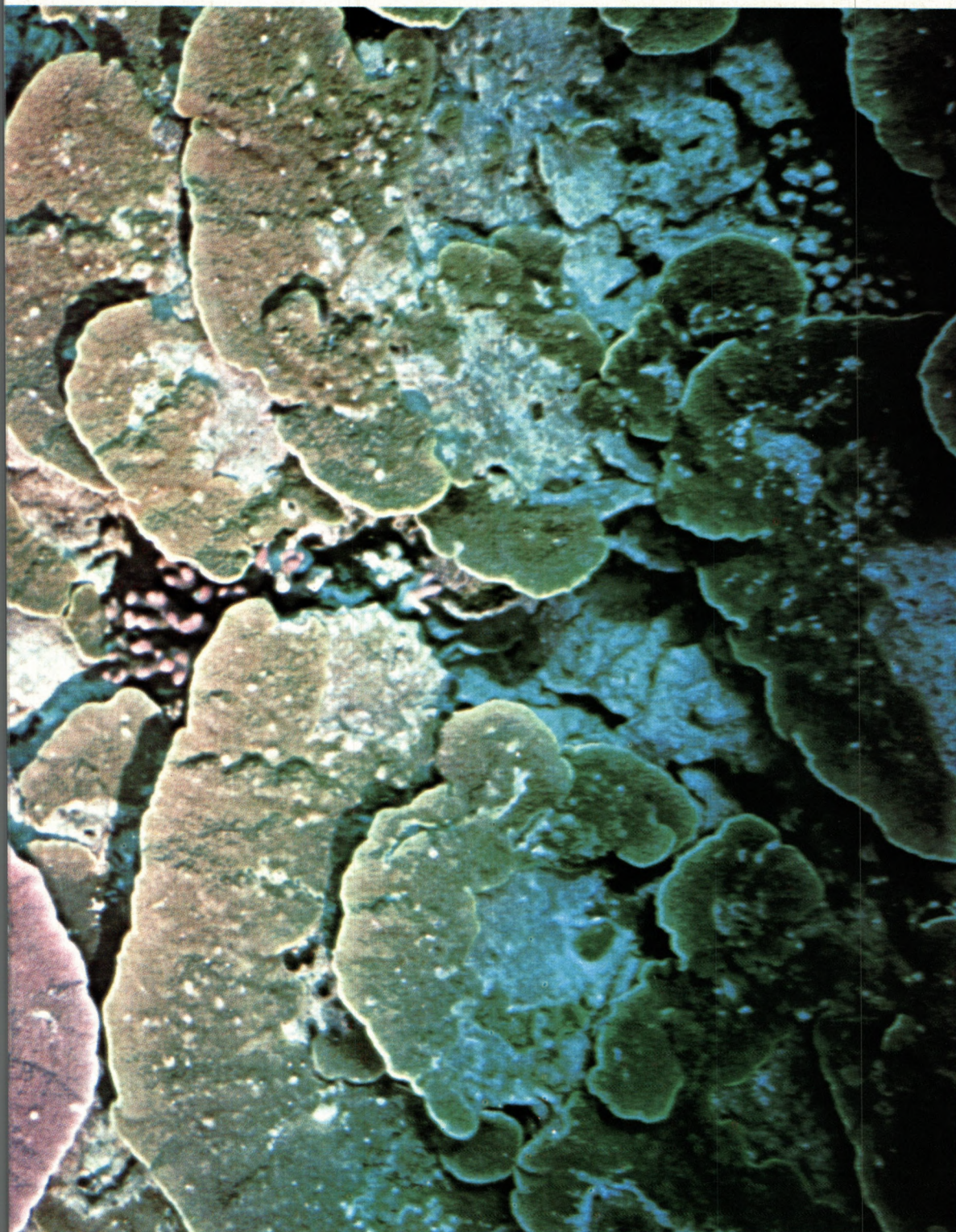
of reef types and shapes throughout this complex, depending on the environmental factors affecting it. But whether linear or oval in design, similar patterns or forms can be recognized. There is generally a reef flat leading to a shallow finger of coral and cementing algae which slopes sometimes dramatically downward and seaward forming spurs and grooves, pinnacles and canyons, huge head corals and

sand channels that meander towards forbidding depths.

In the southern hemisphere about a million years ago, an individual reef began to form some 44 miles off the shore of Australia. Free-swimming planula larva were brought here by a current and found suitable shallows for attachment along the edge of the continental shelf. As the reef along this shallow platform began to struggle for life against

the opposing forces of wave and storm, the reef would flourish and die many times in a continuous cycle as the sea level, temperature, and salinity fluctuated over thousands of years.

The reef prevailed. It eventually matured and the platform became elevated and circular to oval in shape, molded by steady currents. The zonation is symmetrical or similar on all sides, with the heartiest growth



Richard H. Stewart

occurring along the outer rim in response to the abundance of food and oxygen at the seaward edge. The reef continues to grow outward, enlarging the oval and developing precipitous drop-offs along the surf-battered edge. The central part of the reef becomes more sheltered from the surf and wave action robbing the core from the benefits of maximum aeration and nutrition, and eventually much coral and algae dies. As

the central area deteriorates, a lagoon forms and subsequently a smattering of patch reefs composed of corals which can tolerate quieter conditions.

Over the next several decades the seaward edge of the platform reaches water too deep for its continued horizontal expansion. Further growth can take place only in the shallower water, forming a more elongated platform, its long axis aligned with the edge of the continental

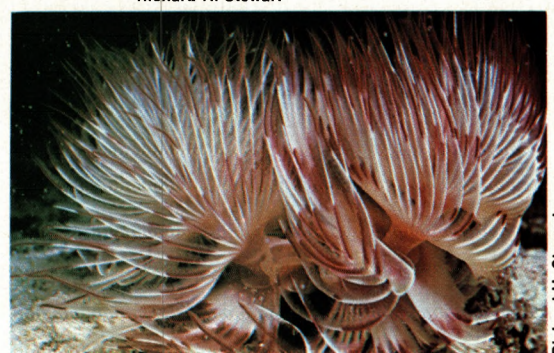
There are approximately 350 species of coral known to live on the Great Barrier Reef — three times the number found in the Caribbean. There is no definite count of the number of fish species found here. Presently over 1,500 species are known, but it is unusual for a collecting expedition to return to the laboratory without at least one previously unknown species.



Richard H. Stewart



Richard H. Stewart



Richard H. Stewart



Jean Deas, experienced Barrier Reef guide, found this large eel hiding under a coral head on the Great Bommies. The Great Bommies are large individual coral heads surrounded by fields of antler coral. In the same area a variety of species, like the butterfly fish and this Wobbegong (above right) can be found. The Wobbegong is a small shark that is generally harmless and quite docile. A macro view of a soft coral gives an indication of the structure of these fascinating communities.



Rick Frehsee



Richard H. Stewart



Richard H. Stewart



Rick Frehsee

shelf. The infinite splashing of waves grinds the more vulnerable corals into well-sorted fine sands, which tend to settle and collect within the core of the platform. Eventually, out of the sand and coral, an island is born.

A white-capped Noddy Tern is blown off course by a rare offshore wind and, after circling our newborn islet, lands momentarily to rest. A sticky fruit from the pisonia tree has

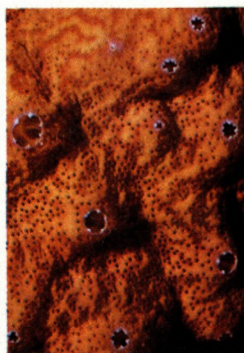
held fast to the bird's feathers and is deposited on the sand. The seed finds sufficient soil, food, and rainfall to begin a life hold on the sandy cay, but it is blown back into the sea with a change of wind. This happens again and again. Some of the seedlings are brought by birds, with perhaps many years between opportunities. Parts of some plants are especially suited for drifting over the sea, and in some cases, are blown

by the wind all the way from the mainland. Eventually a kind of creeping convolvuli of vegetation takes hold and lends support to our small coral cay. At some point there are enough trees to be called a grove. Our island is now more suitable to the birds, and it provides them with food and nesting space. Noddy Terns are periodically joined by Brown Gannets, Mutton birds, Silver Gulls, and slender Reef Herons.

With more time other flora and fauna uniquely adapted to insular life and dispersal find their way to the cay. There are crabs, lizards, and insects too, and soon our little coral cay displays a richness of color and life that will eventually attract the highest, and most destructive, order of intelligence our planet has produced. They smile and frolic on the cay, which they will come to call Heron Island. These complex



Rick Frehsee

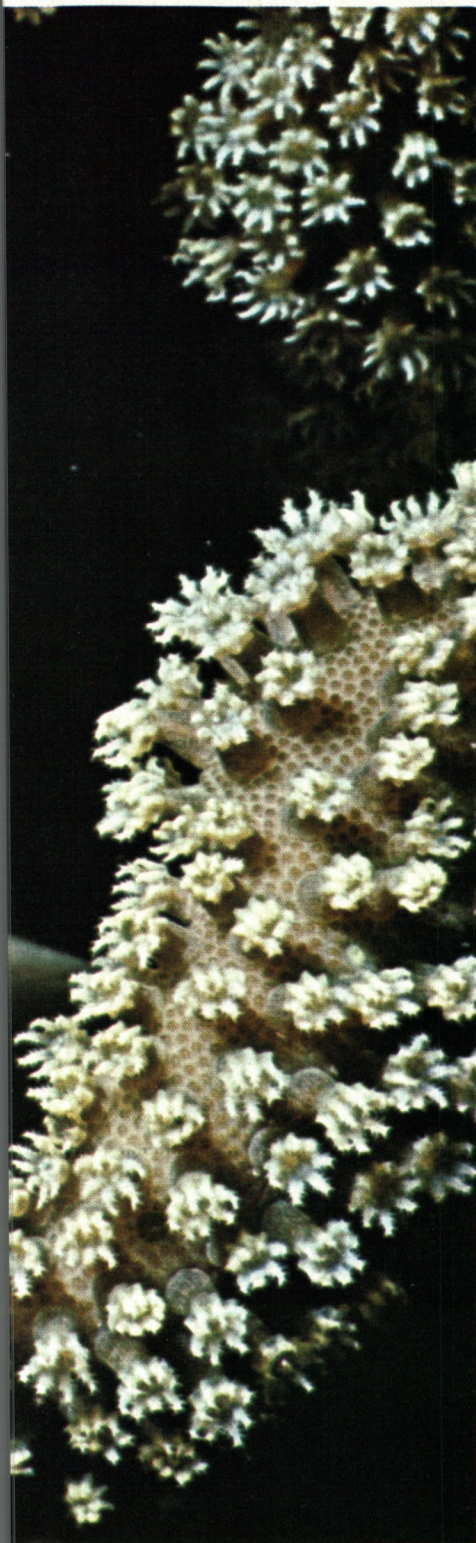


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Rick Frehsee

beings with their impressive cranial capacity will possess the means to bring about immense damage by ignorant disturbance of colonies of breeding birds, dumping refuse, cutting trees or shrubs for firewood, and leaving unsightly remains. Lacking open minds, prudent practices, and self discipline, they could easily undo that which took thousands of generations within the next 50 years.



Richard H. Stewart



Richard H. Stewart



Rick Frehsee

Our helicopter leaves the Australian mainland behind. Below lies the dull, metallic blue Pacific Ocean. From this height the waves look like shallow wrinkles, giving a misleading impression of calm. We are heading out over the sea to a point in the world's largest coral wilderness, the Great Barrier Reef.

Scarcely 20 minutes later, a streak of white froth appears

on the horizon. As we draw closer iridescent green streaks appear just beneath the sea. Who would expect beaches and coral 40 miles out to sea? More slices and patches appear and take shape. Some are circles, others are crescents. One oval patch of white is a gleaming beach which encircles a small forest in its center. Suddenly Heron Island is just below us. One of the 13 islands in the

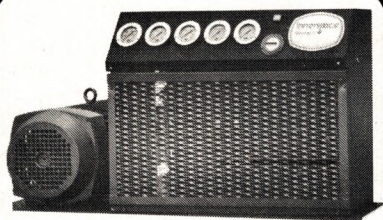
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Soft coral polyps are retracted (opposite page) during most of the day, but at night they extend, trapping food for the colony (opposite, bottom left and at right). Colorful sponges and eels are just part of the array of life along the Reef (opposite page bottom), as are the unusual nudibranchs like this specimen found near Heron Island (top). The partially submerged wreck of a schooner that ran aground on the Reef off Heron Island is popular with both visiting divers and many species of reef inhabitants (above).



Richard H. Stewart

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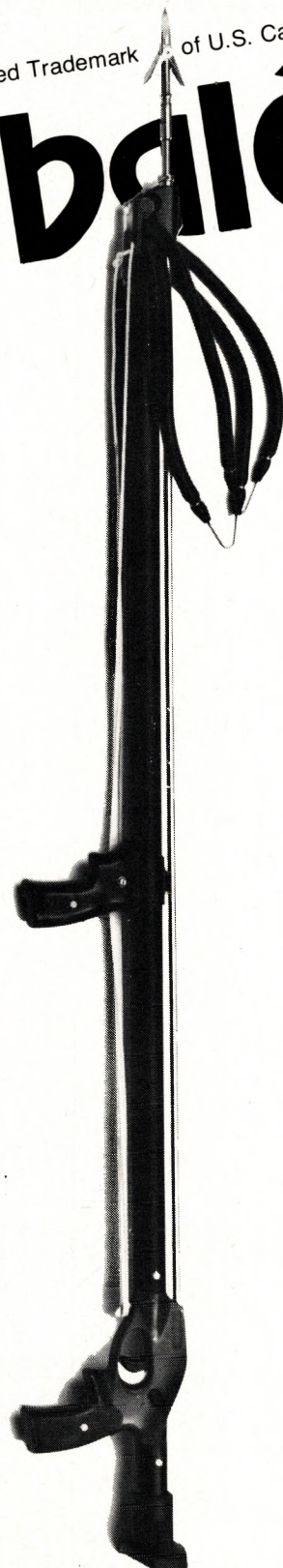
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BENEATH THE SEA

A LOOK AT THE EEL

By Keith Flechas
Photography by Carl Roessler

One of the most uniquely beautiful and dangerous inhabitants of a coral reef is the moray eel. This serpent-like sea creature has been the subject of many myths and misunderstandings. Overall it has a much worse reputation than it deserves.

There are 120 species of morays, living mostly in the warmer seas of the world. Their sizes range from six inches to 10 feet or more. Their color range is also wide, varying from sombre browns and greens to vivid reds and yellows. The dragon moray of the Pacific is reddish-brown with a bizarre pattern of white spots and bars as well as dark blotches. The moray *Echidna Zebra* is as beautifully patterned as its African namesake.

The skin of a moray is thick, scaleless, and covered with slime. There are no pectoral or pelvic fins, but the dorsal fin starts just behind the head and is often high on the front third of the body. When disturbed, a moray will sometimes swim on the surface with his head held high above the water. A large moray with bizarre colors swimming like this would look very much like a sea serpent, his pronounced dorsal fin like a mane.

Many divers can testify to the severity of a moray eel bite. The serious infection that often accompanies the pain has misled many to believe that the moray has



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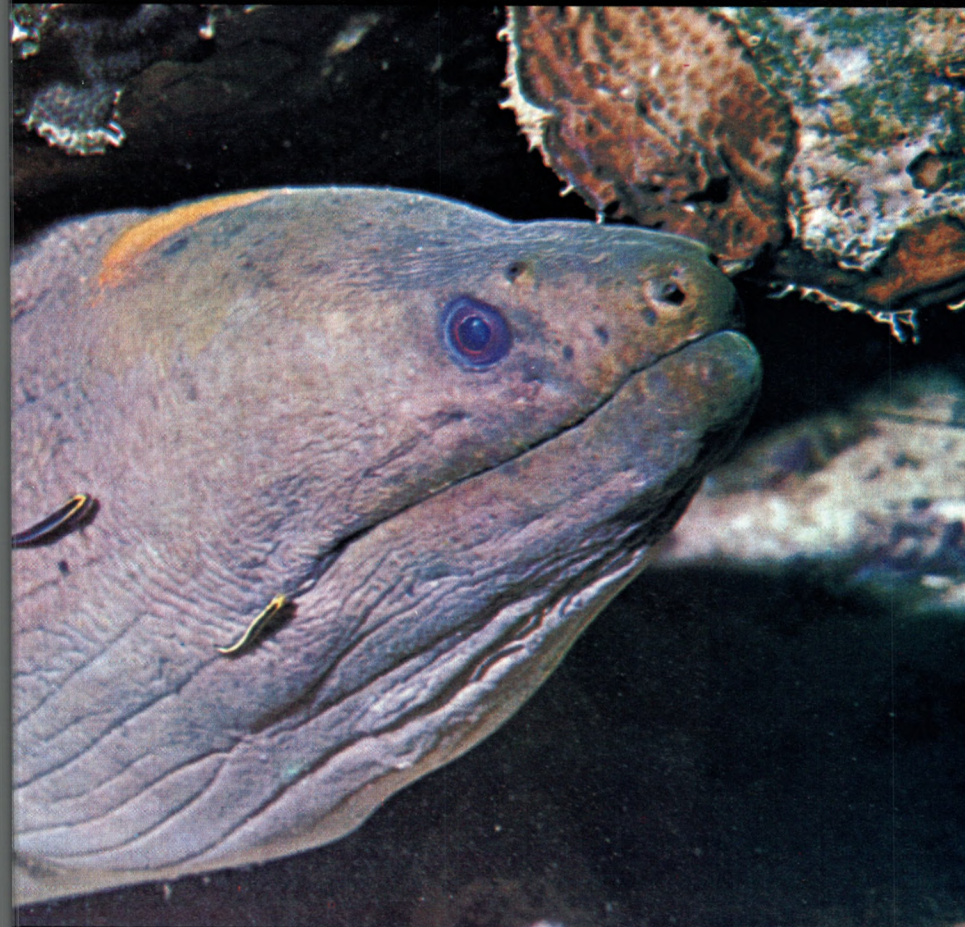


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(4)



venomous fangs. Morays are also widely seen as aggressive and attack-oriented. Recent evidence suggests that morays usually try to avoid man. If cornered or speared, however, a moray will lunge and bite in a tremendous effort to escape.

The octopus is an important part of the moray's diet. Some marine biologists have theorized that when a hand gropes into a dim hole the moving fingers resemble the arms of a small octopus. Therefore the eel's behavior is not an attack on a larger animal, but a case of

- (1) Australian Spotted Moray (*Gymnothorax meleagris*)
- (2) Caribbean Green Moray (*Gymnothorax funebris*)
- (3) Caribbean Spotted Moray (*Gymnothorax moringa*)
- (4) Australian Spotted Moray (*Gymnothorax meleagris*)

BENEATH THE SEA



(5)

mistaken identity or a defensive tactic.

Morays will eat anything they can swallow quickly. The members of the genus *Echidna* even have flattened grinding teeth for eating clams and sea urchins. The chief reason morays must bolt their food is that they need a continuous flow of water through the mouth for breathing. As a result, they seem to be panting, especially when exerting themselves. This is the strongest argument against the stories of morays holding and drowning men.

Morays are caught and eaten in many parts of the world, but occasionally their flesh has proven poisonous. Victims described the symptoms as a scratchy

continued page 144

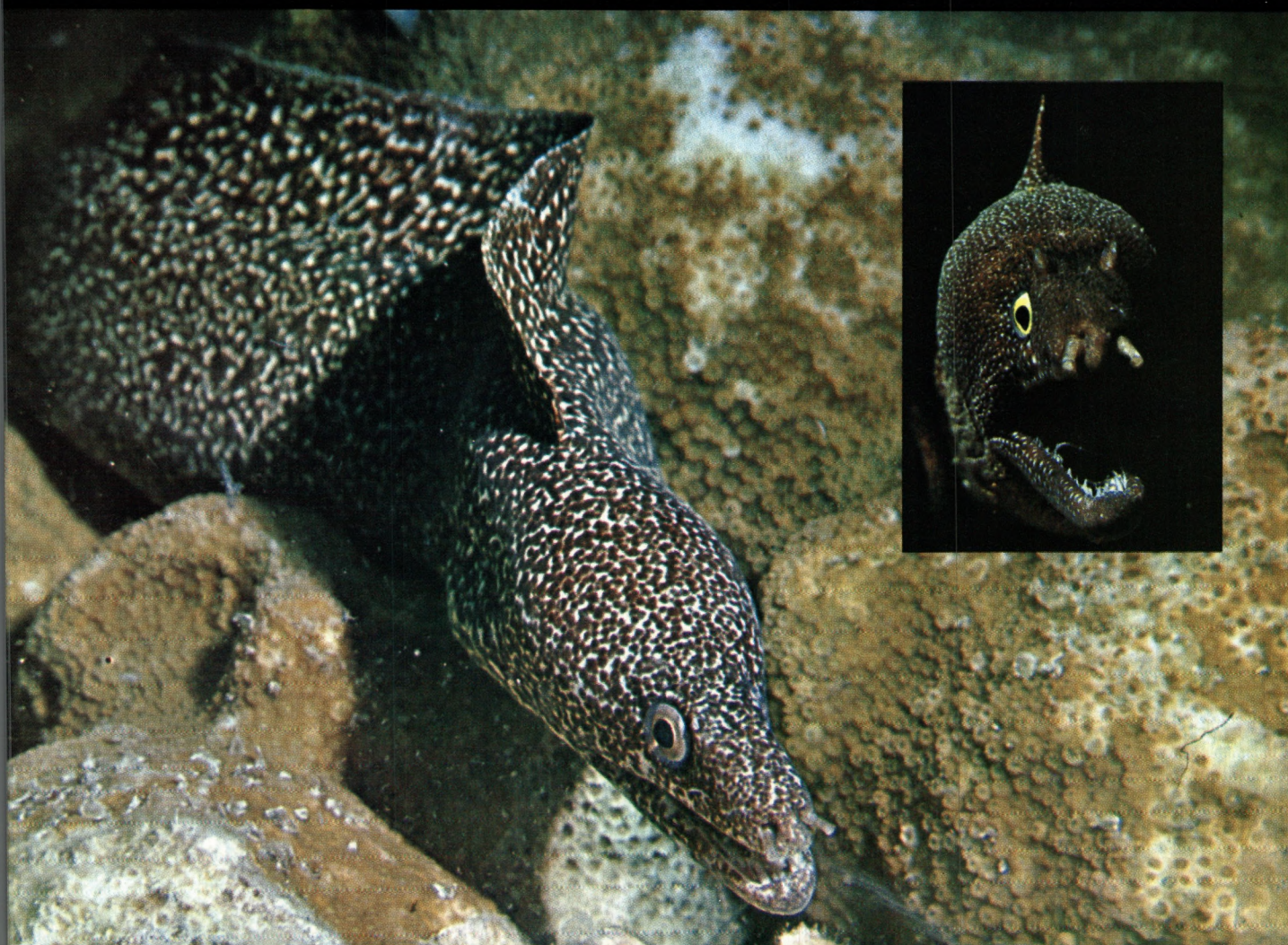


(6)



(7)

- (5) Galapagos Green Moray
- (6) Philippine Snorklenose Moray
(*Gymnothorax rhinomuraena*)
- (7) Caribbean Green Moray
(*Gymnothorax funebris*)
- (8) Caribbean Spotted Moray
(*Gymnothorax moringa*)
- (9) Galapagos Horned Moray



(8)

(9)

The background of the entire advertisement is an underwater photograph. In the lower half, a diver's mask and snorkel are visible, partially obscured by shadows. The water is a deep blue, and sunlight filters down from the top, creating a shimmering effect. Bubbles are scattered throughout the water.

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Story and Photographs by Rick Frehsee

FLORIDA SHIPWRECKS



Wreckage soon becomes part of the bottom; encrusted with coral and algae, this anchor blends perfectly with the reef. The Ice Fog (left) has been raised and restored.

I came to explore the wreck
The words are purposes
The words are maps
I came to see the damage that
was done
and the treasures that prevailed
I stroke the beam of my lamps
slowly along the flank

of something more permanent
than fish or weed
The thing I came for
The wreck and not the story of
the wreck
The thing itself and not the myth

Adrienne Rich



Man's loss is the sea's gain. The wreckage provides a home for algae and the small fish that feed on it. The larger fish that feed on smaller ones are usually not far behind, and the ultimate predators of the ocean, sharks, soon follow.

With the possible exception of super sharks and colossal coral reefs, perhaps nothing titillates the romantic instincts of the sport diver more than the silhouette of a shipwreck resting on the bottom of the sea. There is something in the psychology of humankind in general to which the shipwreck never fails to appeal. One remembers that they not only formed the background of many stories of childhood, but have made bestselling novels in more recent times. Throughout my career as a diver/photographer, I have been fascinated by sunken ships, whether large or small, ancient or modern. When a ship is resting on the bottom, especially one that is fairly intact, you view it in a different light and, observing the metamorphosis it has undergone, gain a better understanding of the processes of the sea. If it is a sunken ship of a previous generation or perhaps of ancient times, she will hold an historical footnote for the

interested diver or the student of archaeology. Whether of historical pedigree or merely a "mutt" of the sea, the diver's moment of discovery often invokes a special kind of magic.

It is impressive to visit a dead ship. It's like a great stage setting. You feel anxious as you head for it, for you know it's there somewhere but you don't see it yet.

Albert Falco

Among sailors the saying "sea room is safety" hints of the predicaments of early sailors who would "thread the needle" between the straits of Florida and the islands and shoals of the Bahamas which lie to the east. This passage, scarcely 50 miles wide, leaves little room for an error in location or position.

If each shipwreck is a product of chance, their general distribution obeys a certain



Shipwrecks that are partially covered by sediment are easily identified by the geometry of the bottom. Perfectly straight lines, arcs, and circles rarely appear in natural formations, and almost always indicate a wreck.

logic. Sunken ships are concentrated around hazards to navigation — reefs, obscure islets, and prominent capes — that lie along the principle maritime routes.

Frederic Dumas

The old wooden galleons were lumbering, clumsy ships. By present day standards, they were no more than nut shells. In the deep Gulf Stream, no soundings could be taken, and without soundings, position was uncertain at best.

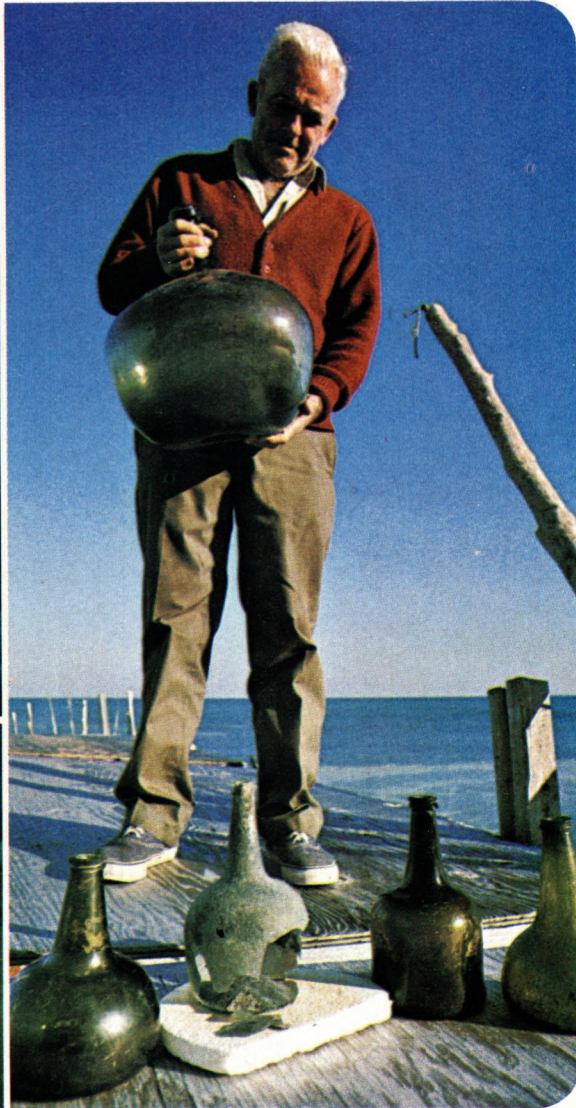
As a matter of fairness to seamen in centuries past, we should emphasize the extent to which they lacked instruments capable of indicating their positions.

Jacques Cousteau with Phillipe Dirole

In the Western Atlantic, during the winter months occasional cold fronts or low pressure air masses move from the

northeast towards the southwest through the Florida Straits. The Gulf Stream current piles up against the opposing force of the wind creating huge, confused seas. From July through October, whirling storms moving counterclockwise around a central eye produce winds of over 100 miles per hour. The ancient mariners could expect little in the way of a warning of approaching hurricanes. Tranquil skies would quickly darken. A sudden gale would rise and the rain would begin. The wind increased in periodic bursts which eventually revealed the full force of the hurricane. Even today, more modern vessels facing a full blown hurricane have quite a fight to survive. Driven by hurricane winds, these early craft faced inevitable collision with the stony tusks of the coral reef.

A storm can drive a ship toward the shore with such force that a collision is



The evidence of hasty departure is almost universal: a disorderly galley, personal possessions strewn about the cabin floors. The older wrecks can harbor beautiful reminders of the past, but now retrieving them is illegal.

inevitable. The only recourse against this menace is to drop the anchors, if the water isn't too deep, and hope that they will hold; which is rather unlikely if the storm is violent.

Frederic Dumas

It is interesting to note that, more modern streamlined vessels, sophisticated satellite navigational systems, and up-to-date weather forecasts notwithstanding, the number of wrecks along Florida's coast continues to grow. Pilots still make errors, ships still spring leaks, and occasional storms continue to play havoc with the best of the steel ships. In addition to sinkings and strandings, derelict freighters and junked vessels have become fashionable artificial reefs and fishing grounds for commercial and sport fishermen. Taking into account the vast number of Spanish galleons, warships, both ancient and modern, coastal

schooners, yachts, steam ships, freighters, sailboats, tugs, barges, cargo vessels, and dinghys, which for hundreds of years have attempted to pass through the narrow straits, it's perhaps easy to understand why some form of wreckage is common in the conglomerates of coral reefs.

There is hardly a shoal in the 150 mile sweep from Key West to Miami on which a trail of ballast rock or scattering of iron fastenings cannot be found.

Martin Meylach

One of my favorite wreck sites is the *Almirante*, a steel freighter, 100 feet in length. After floating derelict in the Miami River, the *Almirante* was towed to sea almost two years ago to be sacrificed to the gods of sportfishing. After her bottom was blown out with dynamite, she eventually settled on the even sand floor



Wrecks such as the Ice Fog, with its masts still erect and rigging intact, are very unusual. Most wrecks resemble a huge scrap pile, and the pieces are sometimes hard to identify. A small hump of sand may hide a galleon or privateer.

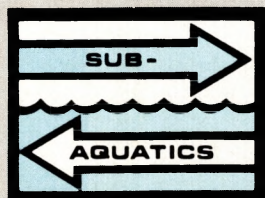
125 feet deep. Visiting divers now happily swim the lengths of her deck at 100 feet.

Two hundred and forty-two years earlier another *Almirante*, or *Almiranta*, plied the same waters of the Florida Keys. She was the flagship of a Spanish admiral and the pride of the 1733 Plate Fleet. Twenty-one galleons left Havana, bound for Spain; all of them sank in a hurricane, scattering their fabulous cargos on the ocean floor. Stored in the ships' holds was a consignment of 12.4 million pesos in silver and gold. The most likely gravesite of the *Almiranta* is very close to Long Key. It would be more than a bit of irony if the 1733 flagship had crashed into the reef, bounced off and sunk in deeper water, and her wealth lay beneath the keel of the modern *Almirante*.

There are basically two kinds of wrecks, modern and ancient, or in terms of construction, wooden as opposed to metal or fiberglass. Of course, there is a

considerable overlap here as some modern boats are still of wood construction and steel vessels have been around for a hundred years or so. We also might differentiate between those shipwrecks that are merely sites for underwater exploration and those that possess true historical or archaeological value. Although there is no hard fast line, in a very general context we can say that any vessel which sank before 1900 may possess historical significance. The reader is reminded that early scuba divers were responsible for plundering and destroying whole wreck sites of historical value prior to 1964. Since that time, the Florida Legislature has enacted laws to protect submerged archaeological sites. The Florida Archives and History Act, Chapter 267 of the Florida Statutes provides for public ownership of shipwrecks and artifacts, and it is a misdemeanor to
continued next page

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disturb either without a proper state research permit. Through the foresight of the Florida Legislature, and with the help of the Division of Archives, History and Records Management, Florida Department of State, present and future historical wreck sites are preserved for posterity. Sport divers are cautioned not to disturb or remove any potential articles of historical interest under any circumstances. Plans are now underway to reconstruct several ancient wreck sites, complete with artifacts including cannons, pottery, and ships' hardware, for the use and enjoyment of sport divers.

The problems in locating an old wooden wreck are numerous and considerable. Exposed to sea water, wood will hold its form for no longer than 50 to 100 years. Obviously a galleon of the vintage year of 1713 or 1733 would no longer resemble a ship in form or shape. First there is the feast:

A wooden ship that sinks in the sea represents an enormous, unexpected source of nutrition for toredos, worms, micro-organisms, and a whole parade of other fauna. Each animal attracts another one, by which it is eaten. The wreck becomes the site of a huge feast, a monstrous carousel.

Frederic Dumas

Before the feast is over, hard and soft corals and encrusting algae will begin to grow. The growth rate of many corals is

Sport Diver

most impressive, for example, *Acorpora cervicornus*, or staghorn coral, is reported to grow at a rate of half an inch per year under the proper environmental conditions. Our shipwreck, without form or shape for lack of wood framework, now becomes buried in coral.

The study of the evolution of coral over a period of three centuries is challenging, but also discouraging; for it is likely that a great many sunken ships have disappeared forever beneath the rising ocean floor and will never be found.

Frederic Dumas

My frustration is obvious when besieged by requests from Manhattan publishers and Madison Avenue art directors for photographs of intact Spanish galleons with masts erect and shredded sails suspended in undersea currents, complete I might add, with treasure chests and skeletons.

One did not simply sally forth and find a galleon bursting with gold, silver and precious jewels. This was the stuff of fiction writers. The best one could expect to gain was striking position; the rest was a matter of chance and slavish hard work.

Martin Meylach

With the galleon shipwrecks the best visual and photographic evidence is in the form of coral encrusted anchors, cannons, cannon balls, and piles of ballast

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rock. Throughout the heyday of the Florida treasure hunter, from the 1950's through the mid 1960's, many wreck sites were discovered by modern day pirates, and many artifacts were salvaged and sold to the highest bidder. The treasure hunters are a marvelous breed who have evolved from pirate to technician all the way, in a few cases, to archaeologist. The survivors such as the Marxes, the Fishers, and the Meylachs, have developed into researchers, engineers and technicians armed with magnetometers and side scan sonars, and work on sites set out by permits from the state of Florida. Few are outwardly wealthy and those that finally strike it rich have paid for it with years of sweat and toil.

The fever that infects the spirit of a man in search of sunken galleon wrecks is beyond rational comprehension.

Martin Meylach

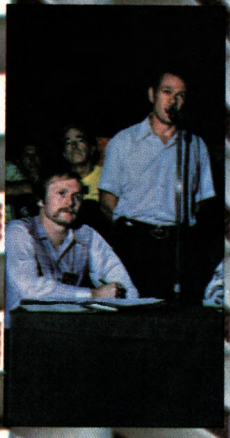
Of the modern shipwrecks, both steel and fiberglass, there are two general classifications; those that are shallow and those that are deep. The shallow wrecks are easily located and, if worthwhile, almost immediately salvaged. Those that cannot command salvage interests are almost always dynamited beyond recognition so as not to present a hazard to navigation. Of the big shallow shipwrecks by far the most popular Florida dive site is the wreck of the

continued page 100

NAUI's IQ9

Another year draws to a close and another IQ has passed. The Ninth International Conference on Underwater Education, sponsored by NAUI, attracted instructors and divers from all over the U.S., Canada, and the Caribbean to the Americana Hotel in Miami Beach, Florida. They heard speakers express their views on a variety of subjects, from women in diving to drug use and scuba.

New this year were the debates. Panels of discussants were brought together to speak on a controversial topic, after which they took questions from the audience. The



The Americana Hotel provided a comfortable setting for IQ9. The participants viewed several debates, a new feature at IQ. For each topic a group of industry leaders was selected to discuss and answer questions from the audience. Also new this year were the pool sessions. Manufacturer's brought new products and invited the divers to try them in the pool.



topics for this year's debates were: Rescue and First Aid, Buoyancy, and Out-of-Air Training. This last topic was discussed by a panel which included representatives of the four major certifying agencies: Dennis Grawer (PADI), Jon Hardy (NAUI), Robert Smith (YMCA), and John Gaffney (NASDS). The intense reaction and broad audience participation engendered by the debates underscored their popularity with the attendees.

Also new was the pool session. The manufacturers brought new equipment and the divers got to try it where it counts, in the water.

A recurring feature of all IQs is the presentation of awards. The Greenstone Diving Safety Award was presented to Dr. Charlie Brown for his work in promoting and advancing diver safety. Dr. Brown is an emergency room physician at a Riverside, California hospital who is intensely involved with sport diving. Through his presentations at instructor courses and conferences, his activities, and writing, he has helped render the mysterious relationship between a diver and his body a little clearer to everyone.

Two NOGIs were presented. Arthur Ullrich received the Sports/Education NOGI for his services to diving through

his 15 year association with NAUI. Robert Marx received the Distinguished Service NOGI for his activities as a scientist, explorer, archaeologist, and writer.

Also presented were 12 Service Awards, and the NAUI Canada Medal, which went to Jon Hardy.

There were, of course, many exhibitors present; manufacturers, travel companies, resorts, and others with information and new gear for the divers. Attendance at the Friday night exhibits area social was very good. Attendance at the post-social parties was phenomenal, it seems many skipped the social and went straight to the parties, thus saving energy by avoiding excessive use of the hotel's elevators. Anytime you get two or more divers together you're bound to get fish stories, and there was no lack at IQ9. The conference offered the attendees the chance to meet old friends and make new ones, most everyone did both with equal facility.

Generally high spirits and a shared enjoyment of the world of sport diving marked the attitudes of the participants. If large gatherings, loud debates, and a lot of good intentions are what it takes to urge along the progress of our sport, (and we suspect they are), then IQ9 was indeed a worthwhile and productive effort.



CURO, gaining international reputation as a force for communications in the diving and subsea industries, has embarked on an ambitious program that includes a new name—reflecting a broader acceptance in the world of ocean interests.

In addition, CURO members have begun work on a diving museum to be installed at Planet Ocean, the ocean science expo and multi-million dollar tourist facility in Miami, and are involved in plans for the First World Congress on Underwater Resources and Oceans, to be held in Amsterdam in late 1980.

According to executive director Lee Turcotte, CURO's new name—still represented by those initials—is the Council for Underwater Resources and Oceans. "Interest in the organization has increased to such a degree that we needed to enlarge the scope of the original Council of Underwater Resort Operators," Turcotte said. The new name reflects more appropriately the goals and activities of this group of ocean-oriented people, involving all aspects of the diving industry, as well as interested and involved outsiders.

Members have been invited to begin shipping to Miami their oldest and most unusual diving artifacts, for a permanent display in Planet Ocean, the new educational and tourist facility built and operated by the International Oceanographic Foundation on Rickenbacker Causeway.

Turcotte reported recently following a trip to Holland that the Netherlands will be host country for an international gathering of experts from the world of the sea, underwater science, and diving.

The congress will be held in Amsterdam, with the assistance and cooperation of Carel C. Steensma, advisor to His Royal Highness Bernard, Prince of the Netherlands.

World CURO, the acronym for the meeting, will host speakers and exhibits from around the world, including the Middle East and the Orient.

Preliminary invitations to the congress are being mailed this month, Turcotte said.

Bert Kilbride, CURO Director from the British Virgin Islands, was scheduled to meet in early November with representatives of the BVI and Bonaire, to discuss the procedures and possibilities of instituting reef laws in BVI. Bonaire representatives were asked to attend and lend expertise in the discussions, especially regarding the difficulties in enacting such laws.

In addition, CURO members are involved in the collection of black coral statistics. They have been asked to forward to CURO headquarters any information and photographs regarding black coral—harvesting, depth, color and hardness, and farming experiments. The information will be published by CURO, Turcotte said.

Latest CURO activities are now related in a colorful newsletter, "CURO: Currents", distributed to members and other interested persons.

For more information about CURO, and membership applications, contact CURO P. O. Box 530173, Miami, Florida 33153.

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The SEA TURTLE in crisis

By John R. Fletemeyer



A three year environmental impact study of the sea turtle has recently been concluded, and the findings indicate a gloomy future for these reptiles. This pessimistic assessment hinges on one fact: sea turtles and seaside commercial development are not compatible.

Along the sea coasts of the U.S., real estate speculators and builders clamor to develop more and bigger projects to accommodate the hordes who seek recreation and retirement near the ocean. As the condominiums and hotels multiply, they commercialize the once serene and deserted beaches which are the breeding grounds of the sea turtle.

Each season, egg-laden female turtles lumber beachward to deposit their clutches of approximately 100 eggs. To ensure the survival of their offspring, they must find a nesting spot that is sheltered and secluded, but many times they find their nesting beaches crowded with sea walls, sewage outfalls, boats, cabanas, and people. The turtles are forced to dig their nests only a few feet from the water, and predictably, many of these are destroyed by summer storms and high tides. If the females do find a suitable spot, a more serious problem may occur after the eggs hatch.

About 60 days after the eggs are laid, baby turtles emerge in unison from their sandy incubator and crawl towards the sea, attracted by starlight and moonlight reflecting off the surf. In developed areas, building and street lights are often more intense than the natural illumination causing the juveniles to wander aimlessly in the wrong direction, often to be crushed by autos.

As population pressure increases, the economic incentive to develop ocean front property increases; greater development lessens the prospects for the sea turtles' survival. The inevitable loser is, of course, the sea turtle.

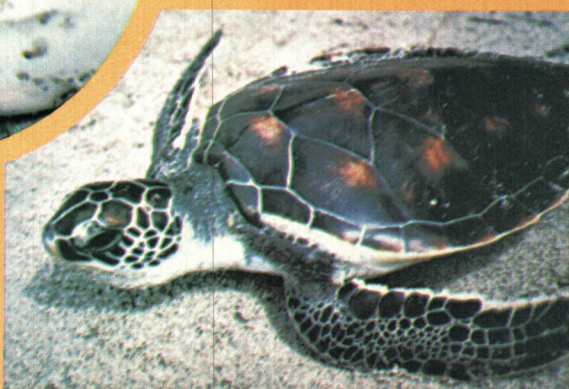
If current trends continue, the eventual extinction of the sea turtle is virtually guaranteed. There are, however, a few pilot projects underway which may be able to save the sea turtle and reconcile the opposing needs of development and



When the female sea turtles come ashore near a heavily developed area, they often must lay their eggs on open stretches of unprotected



beach. The tracks and easy accessibility of the nest make the sea turtle's eggs easy pickings for predators, including man.



breeding ground. Sponsored by the Federal Government and the Florida Department of Natural Resources, experts locate turtle nests which have been made in unsafe areas and remove them to places in which the eggs can develop without interference. When the nests hatch, the juveniles are immediately released into the sea. A few are reared in captivity for nine months or until they are too large to be easily eaten by sharks and dolphins.

The immediate results of the projects are encouraging, and some of the turtles, which were tagged before release, have been found healthy and living normally over a thousand miles away. It is too early to assess the long range results because it takes six years for a turtle to reach maturity. It is not known if these hatchery-produced turtles will possess the instinct of the wild turtles which drives them to return to their home nesting beach to lay eggs. The conservation programs must therefore proceed slowly and carefully until the final outcome is known.

There is much hope among researchers that these turtle projects, or some others, will be able to supply an answer to the problem of turtle versus development. As it stands, the future is not bright for the sea turtle. It would seem that the animal cannot survive without some sort of intervention by man, but it has happened many times in the past that human intervention, no matter how carefully planned, how well-intentioned, often succeeds only in hastening the extinction process it seeks to halt.

The rare albino sea turtle is vanishing even faster than the general turtle population. This specimen was photographed in south Florida, near West Palm



Beach. The turtle replenishment program may or may not be successful; the results won't be apparent until some of the turtles reach maturity in about six years.



Sea Horses

A diver is shown underwater, holding a large, orange, cylindrical Farallon Diver Propulsion Vehicle (DPV). The diver is wearing a mask and a red life preserver. The background is dark and filled with green seaweed or kelp.

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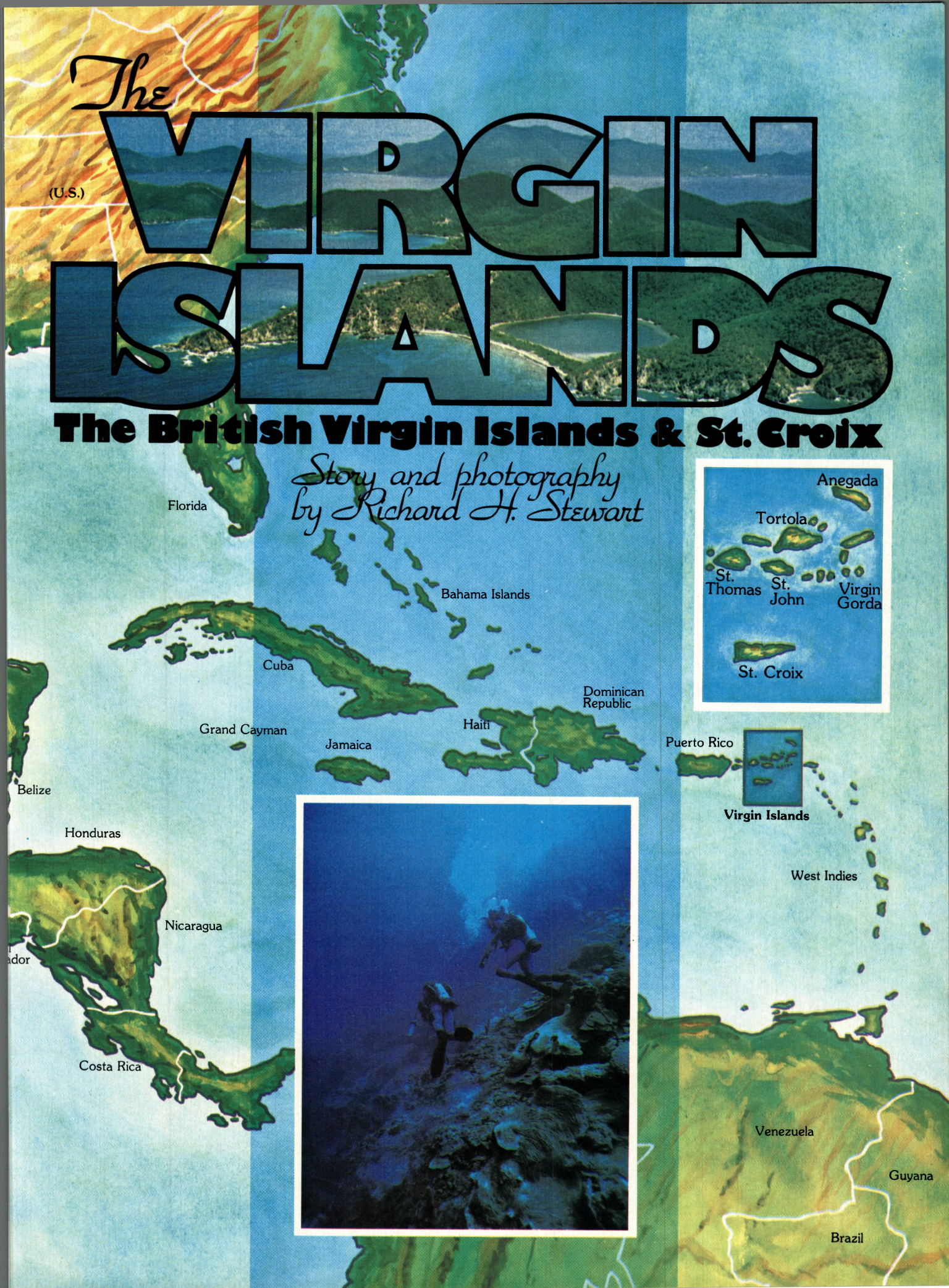
Photo: Jack McKinney

Farallon Industries, 1333 Old County Road, Belmont, California 94002

The VIRGIN ISLANDS

The British Virgin Islands & St. Croix

*Story and photography
by Richard H. Stewart*



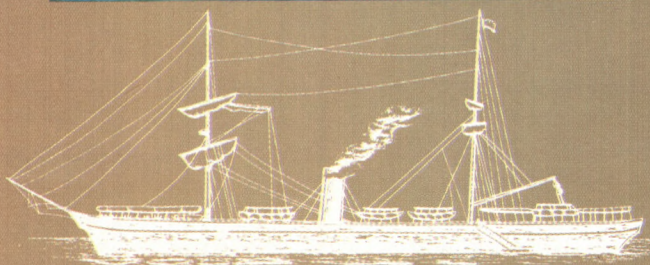


There are a tremendous number of resorts catering to the sport diver, and their rapid expansion and growth attests to their popularity with both new and repeat customers. Their convenience, comfort, and services are some of the many reasons divers return to the resorts year after year.

For the adventurous diver who seeks a change of pace from the yearly hotel-hopping vacation there is an alternative, something a bit more free-spirited: the dive cruise. Before the proliferation of dive resorts, sleep-aboard dive boats were the only way to dive many of the really choice areas. Of course, those were the days of macho diving, when the tougher it was the better they liked it. Today's diver, however, demands comfort for his dollar.

In the BVI (British Virgin Islands) there are at least a dozen reputable, well-equipped dive resorts. Each of these welcomes the opportunity to guide the visitor to the best diving in their area, but none can offer the freedom of movement and variety of diving available from a boat. The *Eros*, operated by Jim Hapgood out of Roadtown, Tortola, began serving the BVI nearly a year ago. Since then many divers have sailed aboard the *Eros* and gone home satisfied that they found something, something different and a bit more challenging. The dive sites, some never before explored, are always just seconds off the bow, and there's no hassle with toting gear back and forth. The evenings are quiet, if that's what you like. Anchored under clear skies,

Sport Diver



In her day the Rhone was a sturdy packet steamer. Today her wreckage is world famous after serving as the background for "The Deep". The almost tame fish that inhabit the wreck and the sea growth that covers the decks make this an ideal setting for the adventurous.



you rest on deck with the cool sea breeze and a thousand stars to keep you company. When the serenity begins to pall, you can order up a shoreside party and cut loose to the familiar ring of the steel drum band. All of this is part of the BVI, and the *Eros* can get you to it.

Very little has been written about the BVI, and information on the diving here is downright rare. Supposedly discovered by Christopher Columbus in 1493, the BVI, or Las Virgines as Chris called them, are located just 18 degrees north of the equator, which explains the near perfect temperatures experienced here year round.



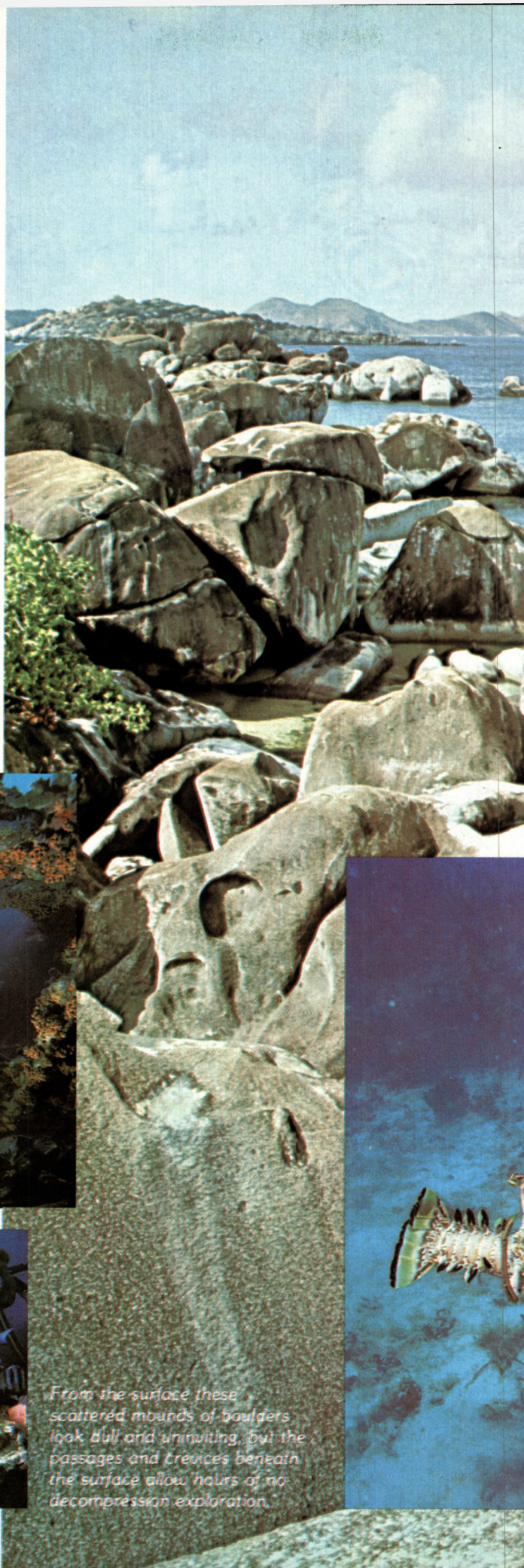
Oddly enough, few hurricanes ever threaten the BVI, but when the Caribbean does whip up some wind, the 75 foot *Eros* slips through the Sir Francis Drake Channel to reach protected dive areas around Tortola and Virgin Gorda.

Cruising through the islands this way has definite advantages. Three hefty meals and numerous snacks stave off the hunger generated by continuous diving, and waking up in the morning already on the first dive site could hardly be considered an inconvenience. If you're not in the mood for night diving, local entertainment is only a port away, unless you'd rather stay aboard and sip pinacoladas far into the quiet evening. In between dive sites the *Eros*' sundeck is a great place to find that golden brown tan you expect to go home with.

In addition to the dozens of rock and reef sites,

perhaps the BVI's greatest attractions are the Baths and that near-legendary movie prop, the *Rhone*. The Baths are simply countless boulders piled one atop the other, lining the southern tip of Virgin Gorda. On the surface there are numerous passages that wind between the boulders, leading to a shallow pool of water hemmed in by giant granite rocks. The pools are outstanding for swimming, partying, or just thinking; and as the afternoon sun streams in through small fissures, the interior glows softly with muted greens and grays.

Beneath the Baths lies an incredible world of brilliant yellow soft coral, and a variety of fish wander slowly through the gaps and crevices. While the average depth here is 20 feet, there are shafts that lead down to chambers 35 or 40 feet below the surface. The chambers are not particularly hazardous and are not closed in like a cave. In each there are a number of short passages that lead to open water, but of course, all who dive them



From the surface these scattered mounds of boulders look dull and uninviting, but the passages and crevices beneath the surface allow hours of no-decompression exploration.



should exercise caution.

The ultimate dive in the BVI has to be the highly publicized wreck of the *Rhone* off Salt Island. Often described as the most beautiful wreck in the Caribbean, the *Rhone* has a graceful, upswept clipper bow. She is broken into four sections, which lie in depths of 20 to 80 feet. Smothered by a marvelous variety of brain coral, sea whips, and gorgonians, the *Rhone* is an excellent setting for the underwater photographer. Bright blue and purple tube sponges grow along the railing, while inside a brilliant carpet of orange and yellow soft coral lines the hull. The many fish found near the *Rhone* are quite tame and can be hand fed.

The BVIs are truly remarkable; greenclad mountain peaks that cut off the bottom of the sky and then slide into the ocean. The diving is exceptional with an average visibility of 80 feet and many unique rock formations. After a full week in this tropic atmosphere, the thought of going home is discouraging. Due to the proximity of the U.S. Virgin Islands, your return trip can be arranged to depart from St. Croix. From Roadtown, Tortola, the Antilles Airboat Company maintains direct 15 minute flights to Christiansted, St. Croix.

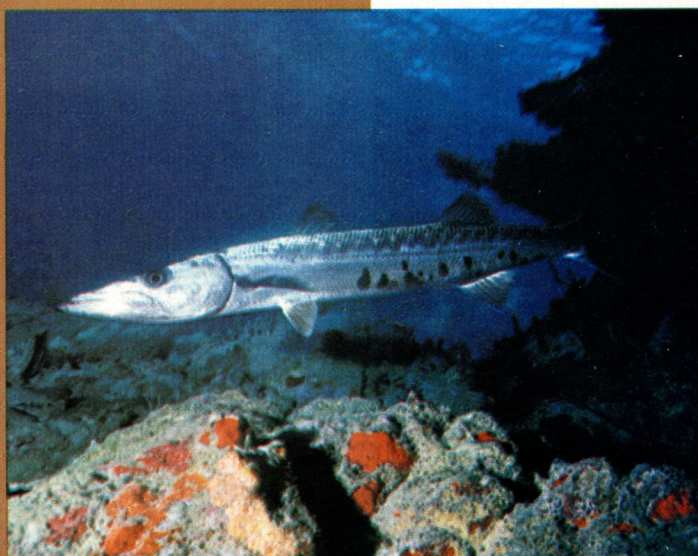
St. Croix of the USVI is set apart from the rest of the Virgin Islands. A channel 40 miles wide and 13,000 feet deep separates St. Thomas/St. John from St. Croix. This channel provides divers with a great drop-off just a few hundred feet from the beaches.

One of the most popular drop-off dives is Cane Bay, less than 20 minutes west of Christiansted. Beach diving off Cane Bay takes you across mounds of elkhorn coral inhabited by a colorful assortment of reef fish. Once at the ledge, the bottom drops away almost vertically into a blue-black void. Hanging onto the wall are the

Sport Diver



Large growths of black coral are not uncommon at the various dive sites around the BVI. The variety of sea life is outstanding, and divers will undoubtedly encounter many inquisitive fish here. The barracuda below moved in close to satisfy his curiosity, then disappeared. The Cain Bay drop-off is an outstanding wall dive. From a fairly shallow, flat bottom close to shore, the rocks suddenly descend vertically into the channel that separates St. Croix from St. Thomas and St. John.



most vibrant subjects a photographer could wish: yellow sponges, coral and purple sea whips.

Another exciting dive is the Frederiksted Pier. Extending almost a quarter mile into the sea, its hundreds of concrete pilings harbor many varieties of sea life concentrated in a small area. The water visibility is exceptional, not at all what you'd expect around a commercial pier. In the 20 to 40 foot depths you'll find outstanding subjects for macro photography like crabs, feather dusters, Christmas tree worms, coral shrimp, unusual batfish, and some very large and colorful sea horses.

There are dozens of other great dives around St. Croix, but save some time for a landside tour of this 21 mile long island. From Udall Point, which is as far east as you can go in the U.S., the Coastal and Mahogany Roads run around and through the center of the island. There are historical sites too. Fort Christiansvaren is the oldest of the five remaining Danish forts in the Virgin Islands. Built in 1734, it is a remnant of the two and a half centuries of Danish rule which ended in 1917 when the United States bought St. Croix from Denmark.

As with the entire Caribbean, the British Virgin Islands and St. Croix have a never ending amount of



On the surface a place of quiet repose, the rocks and crevices beneath the Baths harbor clusters of fiery red and yellow soft corals. The tentacle-like arms of the soft corals trap tiny plankton floating in the water.

historic features and drama. It doesn't take much to visualize the days when pirate vessels cruised into the ports of Christiansted and Fredericksted, for much of the town's decor surrounding the port remains the same. Only the times have changed.

For your next excursion to the Caribbean consider St. Croix and the British Virgin Islands.



A complete range of diving services are available in both the U.S. Virgin Islands and the B.V.I. For help in planning your vacation or information concerning rates, package tours, et cetera, contact the following:

St. Croix

Caribbean Sea Adventures
King's Wharf
P.O. Box 3015
Christiansted, St. Croix,
USVI 00820

Club Comanche Hotel
1 Strand Street
Christiansted, St. Croix,
USVI 00820

Do It Fluid Tours
P.O. Box 3234
Christiansted, St. Croix,
USVI 00820

Mar Y Sol Divers
10 Strand Street
Fredericksted, St. Croix,
USVI 00820

Pressure, Ltd.
P.O. Box 3612
Christiansted, St. Croix,
USVI 00820

Refractions, Ltd.
Caribbean Reef Club
Pelican Cove, St. Croix,
USVI 00820

St. Croix Scuba Center
P.O. Box 144
Christiansted, St. Croix,
USVI 00820

United States Virgin Islands
Tourist Office
100 North Biscayne Blvd.
Miami, Florida

Sport Diver



The Fredericksted Pier on St. Croix affords the photographer almost limitless opportunities for macrophotography. In addition to bristleworms, crabs, and small tropicals, the numerous sea horses are particularly unique. The deep blue water of the Cain Bay drop-off conceals many brilliantly colored tube sponges.



V.I. Divers, Ltd.
Pan Am Pavilion
Christiansted, St. Croix,
USVI 00820

V.I. Industrial Gases
P.O. Box 3770
Christiansted, St. Croix,
USVI 00820

The BVI

Anegada Reefs Hotel
Att: Jaki
P.O. Box 40
Virgin Gorda, B.V.I.

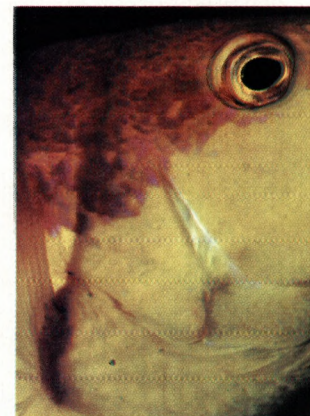
Aquatic Centres
Luana Marler
Box 108
Road Town, Tortola, B.V.I.

Dive B.V.I., Ltd.
Virgin Gorda, B.V.I.

Drake's Anchorage
P.O. Box 295
Road Town, Tortola, B.V.I.

Fleet Indigo
P.O. Box 9243
Treasure Island, FL
USA 33740

Kilbride's Underwater Tours
Att: Jaki
P.O. Box 40
Virgin Gorda, B.V.I.



Latitude 18°25' Charters, Ltd.
1430 Larimer Street
Denver, Colorado USA 80202

Lord Nelson Inn
Virgin Gorda, B.V.I.

Marina Cay
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Prospect Reef
P.O. Box 104
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The Bitter End Yacht Club
875 North Michigan Ave.
Chicago, IL, USA 60611

The Moorings
P.O. Box 50059
New Orleans, LA USA

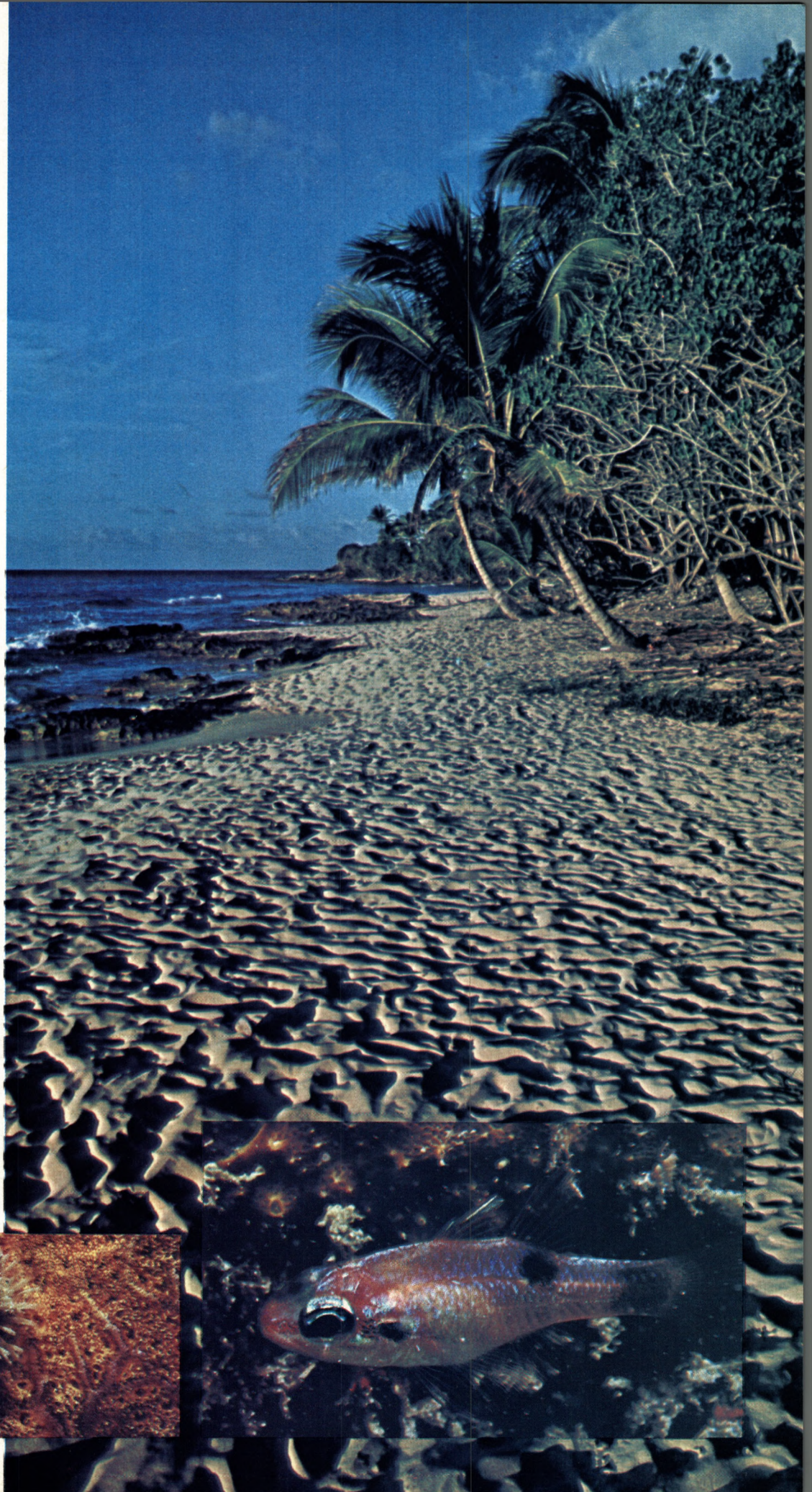
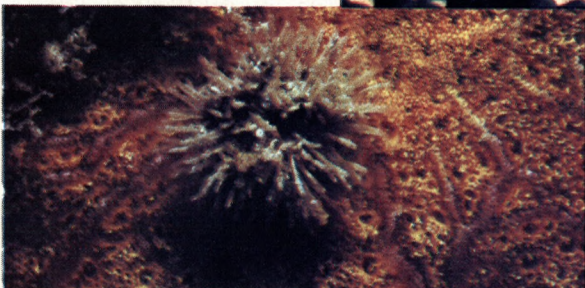
B.V.I. Tourist Board
P.O. Box 134
Road Town, Tortola, B.V.I.

Eastern Airlines
Miami International Airport
Miami, FL USA 33148

See & Sea Travel Service, Inc.
680 Beach Street
Suite 340 A
San Francisco, CA USA 94109

Treasure Isle Hotel
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Village Cay Marina
P.O. Box 17
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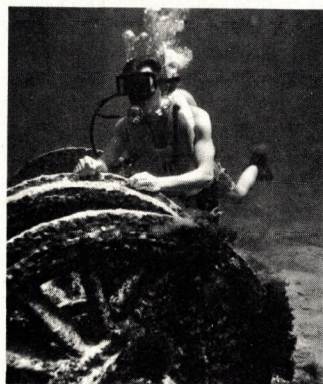
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FLORIDA SHIPWRECKS

continued from page 86

Benwood, a steel freighter scattered over 300 feet of bottom close to French Reef in Pennecamp Park off Key Largo. More a wreck than a ship, the *Benwood* was run aground by her captain, supposedly after being torpedoed by a German U-boat during the last years of World War II. Thereafter she was further dismantled as she lies in 44 feet of water. The deep end of the *Benwood*, which I believe to be the stern and not the bow, is somewhat intact and the most interesting part of the wreck site.

The final category for our Florida shipwrecks are the deep modern wrecks. These are by far the most mysterious and represent the most challenging dives. There are many shipwreck stories, some proven, some believable, and some improbable. Because they are deep they are perhaps least salvageable, generally the most intact. The wreck of the *Mispah* in 90 feet of water off West Palm Beach is an exciting dive, perhaps too exciting for many if the current is ripping. Off Miami there are a growing number of artificial reef shipwrecks which are within a sport diver's range. The wreck of the *Almirante* is but one example. Further south there are several deep wrecks off Key Largo. Most are quite deep and are subject to Gulf Stream currents. One of the most durable shipwreck stories is the myth of a German submarine. It has been located for me on marine charts in seven or eight different locations from West Palm Beach to Key West. This mysterious sub is obviously drifting back and forth in the Gulf Stream current. Perhaps one of these locations is a true one, but I have never talked to a diver with firsthand evidence. Sorely missed is the wreck of the *Ice Fog*, a 70 foot North Sea tug that had provided me with exciting photographs of a modern ship upright on a sandy bottom, 125 feet deep off Molasses Light, Key Largo. Pictures of the *Ice Fog* were published in a number of publications and were welcomed by the Madison Avenue types seeking the impossible single photograph of an entire shipwreck. The *Ice Fog* has been salvaged and refurbished by a Miami marine contracting firm.

The best method for locating shipwrecks is, as always, with the help of someone who has been there. Certain wrecks are easy to find from a boat because of the shape, size, or their proximity to a lighthouse. Where this is not the case, ranges and/or compass bearings are necessary. Don't depend upon your memory. If you find an exciting shipwreck take your own bearings or ranges. I keep a small notebook for this purpose and in addition occasionally I will make drawings or take photographs of the

continued page 106

AUSTRALIA

continued from page 73

Capricorn group, it is our ultimate destination, one we have traveled half way around the world to reach. It looks exactly as the imagination dictates a lonely Pacific coral island should appear: a green oval encircled by a white frame, surrounded by turquoise shallows, set in a sea of Cerulean blue. On the outer edge of the turquoise circle are shallow reefs of gold. There is a single channel through the reef, and what appears to be a shipwreck guards its seaward entrance. The helicopter sinks towards the island, hovers momentarily and settles down on the beach. We stumble forward, blinded by the sun reflecting off the sand, eager to begin our Australian diving adventure.

Heron Island is the only full facility diving resort on the Great Barrier Reef, but it's not a bad little island to visit. Heron is a true coral cay about a kilometer long and 300 meters wide with a surrounding coral reef about 15 kilometers long — that's quite a lot of coral reef to dive. The island is shared by a small resort and a research station. The resort rates an excellent all the way around and there are adequate dive boats, compressors, a well-run dive store, and professional divemasters.

The diving around Heron Island is good, with one spot rating an excellent. About 470 species of fishes can be found here and over 50 genera of reef corals.

In addition to selected dive spots it is possible to go almost anywhere around the platform and find good diving. Most areas have massive coral protrusions and sand or surge channels, and there are many well developed canyon and ledge systems, some with small caves and "bridges". The acropora (staghorn) corals dominate the reef front with over a dozen species represented, while the heavy lobular types dominate the seaward slope.

With so much delightful environment it might be constructive to mention some of the reasons why Heron Island diving doesn't rate an unqualified excellent. Actually there is little in the way of bad news to offer, but one should consider the definite diving season here and divers from other parts of the world should be aware of rather consistent currents that are impossible to swim against. I have mentioned the extensive tidal range here and with it comes dramatic tide rips with each change. These tidal currents along with the fact that Heron is not really at the seaward edge of the barrier reef complex makes for an average visibility of about 20 meters (65 feet); pleasant but not crystal clear.

Walt and Jean Deas and Mike Hayes are the current divemaster/guides for wet excursions. These people

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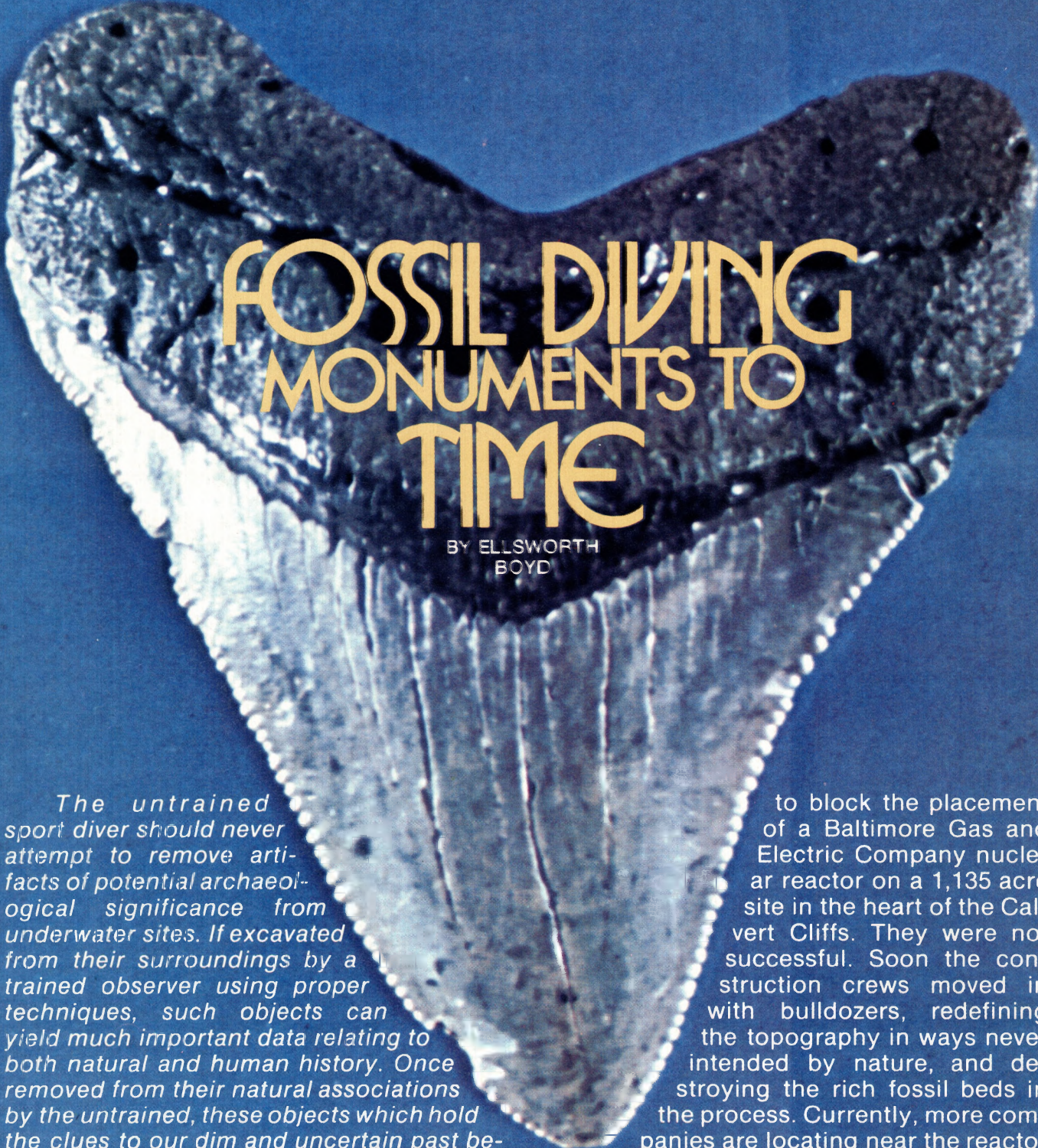
made an immeasurable contribution to the success of our underwater photography. On the occasion of the World Underwater Conference we shared this tiny island with a hundred other photographers and writers from 17 countries, none of us could expect special attention. Walt and Jean are professional photographers and writers of world-wide reputation, and as such they provided us with phenomenal support. Without using the actual words, they reached out to us to say, "We too are underwater photographers and know how difficult professional results are to come by during a short stay. We will do everything to help you get your pictures." I think that most visiting photographers could expect the same. Mike is as capable and personable a dive guide as I have found anywhere in the world.

The final dive was at my favorite spot, the one of which receives an excellent rating. About a third of the way from the harbor entrance to the western tip of the reef and just opposite a coral shingle bank that is well out of the water at low tide, is the dive location known as the "Bommie". The word bommie is used by Australian divers to denote most any massive or lobular protrusion of hard corals or coral heads. The name comes from the Aboriginal word "bombora"; a submerged rock. The Bommie here, consists of at least three massive coral heads which rise abruptly from the sea bed in 6 to 15 meters (20 to 50 feet) of water. Almost immediately upon entering the water, before I could clear my face mask or check camera settings, I was surrounded by the familiar bat fish; large flat-sided fish with dark grey stripes, a small mouth and an unquenchable curiosity. They swam to within inches of me peering straight into the front of my mask. They quickly gave me the once over and, satisfied that I was not the "feeder" on this dive, swam lazily towards to coral head. The second bommie which is slightly deeper usually houses two large golden moray eels who literally swam out of the reef to confront Jean Deas head on. They eagerly fed from Jean's hand the

scraps of bacon left over from the breakfast table. One swam over to me, gently sniffed the dome of my fish eye lens and then swam between my legs and back to the bommie. They are the most tame moray eels I have seen anywhere in the world, a product of almost daily feeding over a period of many years. I spotted other familiar tenants of the bommie, pugnacious coral trouts and coral cods, diagonal banded sweet lips and the comical barramundi cod. I swam into deeper water sinking slowly towards the third and deepest coral head. There, lying on the bottom, was my friend the Wobbegong shark so well camouflaged against the bottom that an uneducated eye would mistake it as part of the ocean floor. I strained my eyes into the hazy blue hoping to catch a glimpse of a giant manta ray that I had seen on an earlier dive and who frequents the area. After checking the ledges on the deep bommie for a last look at the feathery tube worms and colorful nudibranchs, I gently finned my way back up the rear slope. For the final part of the dive and my farewell experience on the barrier reef, I selected a view just below Mike Hayes who was beginning to take small pieces of bread from beneath his wetsuit sleeve. Shoals of reef fishes of all sizes circled Mike, turning in the blink of an eye lid. There were so many that from below they occasionally blotted out the sun and fused with Mike's image, creating abstract forms. They danced in circles, spirals, and figure eight patterns, displaying insatiable appetites. Sunlight or strobe light occasionally glanced off the sides of their bodies. A lasting view was imbedded in my mind of diver and fish as one, an infinite flock of sub-sea birds through which shot bullets of piercing brilliant sunlight. This adventure was ending but I was not saddened, for I knew at that very instant that I would be back.

The author and publisher would like to extend a special thanks to Mr. Andrew Maluish, President of the Australian Diving Federation, and Mr. Chris Boyle, the Federation's head divemaster for their help and support.





FOSSIL DIVING MONUMENTS TO TIME

BY ELLSWORTH
BOYD

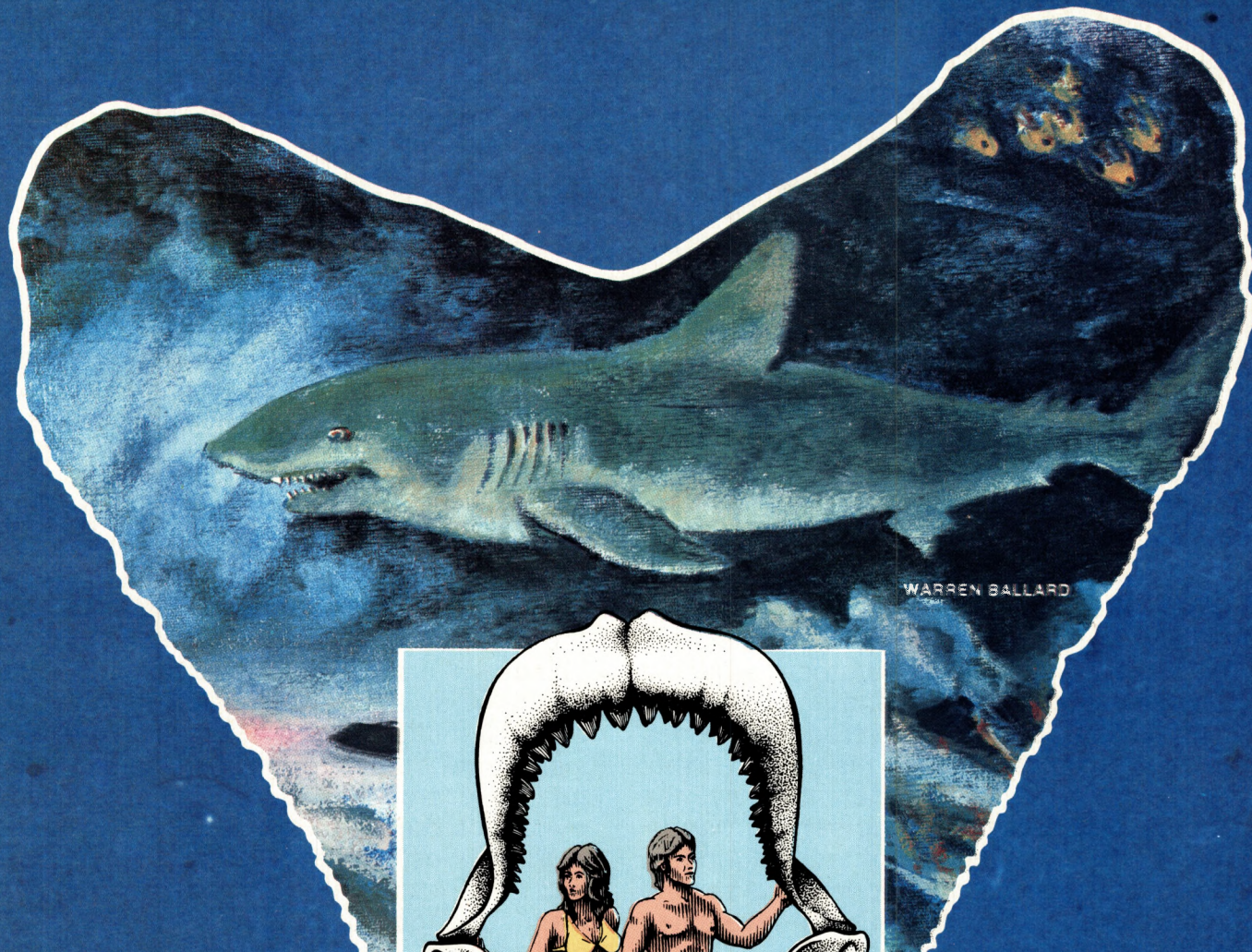
The untrained sport diver should never attempt to remove artifacts of potential archaeological significance from underwater sites. If excavated from their surroundings by a trained observer using proper techniques, such objects can yield much important data relating to both natural and human history. Once removed from their natural associations by the untrained, these objects which hold the clues to our dim and uncertain past become useless bric-a-brac. (Editor's Note)

The Calvert Cliffs of Maryland are one of the natural wonders of the eastern U.S. seacoast. The area harbors countless reminders of the past; the fossilized teeth and bones of giant predatory fish that inhabited the ancient seas, including an 80 foot long shark, *Carcharodon Megalodon*.

The cliffs are an incredibly rich paleolithic site which has been endangered by construction. In 1970, 10,000 concerned citizens, conservationists, divers, and outdoorsmen banded together in an attempt

to block the placement of a Baltimore Gas and Electric Company nuclear reactor on a 1,135 acre site in the heart of the Calvert Cliffs. They were not successful. Soon the construction crews moved in with bulldozers, redefining the topography in ways never intended by nature, and destroying the rich fossil beds in the process. Currently, more companies are locating near the reactor site. This influx of industry is the reason for prospecting the cliffs and waters surrounding the construction site before they, like the huge sharks that once swam here, vanish.

Joe Dorsey, Wade Clark, and Bob Langley took up a fossil hunt where the surfcombers left off, and ventured underwater in search of treasures from the Miocene Age, which began about 25,000,000 years ago and lasted 15,000,000 years. From the shallow waters of Chesapeake Bay just off the cliffs, they



brought up many fine Miocene marine fossils. With entrenching tools and sieves the divers recovered hundreds of shark teeth, some so large that curators of the Smithsonian Institute speculated the living sharks were bigger than some of today's whales. Sea cow bones, ribs, jaws, vertebrae of whales, and bags full of sand dollars were also extracted along with the beautifully symmetrical shells of early scallops.

The thrill of fossil diving is addictive. Bill Scheible, an experienced fossil diver and scientist said, "Once you've found your first gigantic shark tooth, or a bit of whale bone, or a perfectly preserved scallop, you'll probably become a fanatic. There's an indescribable thrill—you never know what you'll find next, and there's that thousand-to-one chance that you'll come up with an extraordinary scientific find."

Scheible did just that. With a fellow diver, he retrieved a vertebrae belonging to a



Carcharodon
Megalodon (above)
and reconstructed
Megalodon
jaws.

previously unknown sea cow. His experienced eye alerted him to the uniqueness of the specimen, and after a paleontologist at the Smithsonian made a positive identification, he donated the vertebrae to the museum where it is now on public display.

Still, it is the giant shark teeth that hold the greatest interest. As the shark's skeleton is composed of cartilage instead of bone, teeth are the most common remains recovered today. The *Carcharodon Megalodon* was the largest of the prehistoric sharks known today. Approximately 80 feet in length, it must have been the terror of the sea, baring hundreds of serrated teeth up to eight inches long.

Teeth from the Great White Shark, *Carcharodon Carcharias*, a 60 foot shark, have also been recovered as have teeth from smaller species: Tiger, Mako, Hammerhead, and Sand sharks. Many teeth are difficult to identify as some sharks have a variety of teeth in their jaws. Also, like humans, they



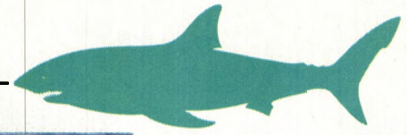
Diving for fossils in the muddy waters off the Calvert Cliffs can be both frustrating and fruitful. Visibility in the silt-filled bay averages only a few feet, but the fossils are plentiful and exciting. Two fossil divers display their "catch" for the day, four giant shark teeth and a shell (left). The map (bottom left) shows the location of the Fall Line. This is the point at which higher ground underlaid by rock meets the lower sedimentary Salisbury Plain.

lose their young teeth and grow more permanent ones.

The teeth were permanent until they chomped down on something rocky or callous. In some instances this may have been the bones of the Cetothere whale, a favorite food of the scavenging sharks. As most of the bones recovered have been those of juvenile whales, it is assumed that the Cetothere used what is now the Chesapeake Bay for its "nursery" grounds. That the giant sharks delighted in dining on baby whales is confirmed by the several whole whale skeletons which have been found with shark teeth imbedded in them.

The Calvert Cliffs and the rest of southeastern Maryland belong more to the sea than to the land. The soil is that of the sea bottom, more accustomed to the clam than the plow; the Salisbury Plain still smells of Leisocene brine. This area is called the Bay Country, and it has been above water for only 12 million of the 136 million years. It was thrust up by a minor earthquake a few million years after more significant earth dynamics built the Rockies and Cascades. During most of the area's history, the shoreline ran between Washington and Baltimore and hooked up over the northern end of what is now Chesapeake Bay. That





At various times, all the land east of the Fall Line has been completely submerged. During the most recent glaciations, however, the coast was located 100 miles east of Ocean City, which is today right on the ocean. The Calvert Cliffs are situated in southern Chesapeake Bay, near Leonardtown. The two large Carcharodon specimens at the bottom of the page are typical of the fossils found near the Cliffs, which can range from one to eight inches or more in length.



line is commonly called the Fall Line by geologists because small falls and rapids occur along the waterways where high, rocky land meets lower, flat topography. The land to the northwest is higher and rougher because it has almost always been dry, underlaid by hard volcanic rock that has been twisted and compressed, while land to the southeast is gentle because it was formed in a simple layer fashion beneath a shallow sea.

The depth of that sea varied as the land all along the eastern seaboard was rising and falling during the Paleocene, Eocene, and Oligocene epochs. During the Ice Age

glaciations, much of the earth's water was trapped in the huge glaciers, and the oceans receded. Off the Calvert Cliffs, the shoreline was apparently about 100 miles east of Ocean City, near the edge of the Continental Shelf.

Nature took great pains to hide Maryland's mother lode of fossils, crushing them under glaciers, dropping them into chasms, and burying them under tons of silt in the sea. But nature is no match for man's probing curiosity. With the aid of mask, fins, and snorkel, Maryland's fossilized remains of the ages continue to be uncovered and their secrets bared.



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FLORIDA SHIPWRECKS

continued from page 100

shoreline as it appears from the wreck location.

In the vast expanse of the sea an area the size of a city block shrinks to nothing.

Martin Meylach

While diving, learn to develop an eye for the unusual. There are very few straight lines, angled edges, circles, or symmetrical curves in a coral reef or in nature in general. Not long ago, while diving in shallow water off Molasses Reef, I caught out of the corner of my eye a glimpse of a straight line along a dead coral bottom. Closer examination revealed an old kedge type anchor nearly 12 feet long. I wondered how many hundreds of divers have swam over that bottom without seeing the anchor. As it is located within the confines of Pennecamp Park, it should remain there for others to discover, photograph, and appreciate.

Under the water, even more than on land, you see only what you're looking for.

Frederic Dumas

If you have ever seen a coral encrusted hull suddenly appear from the misty blue or swam down a listing companionway accompanied by a curious grouper, or watched your air bubbles disappear in hidden cracks and crevices inside a wreck, or discovered a proud and stubby cannon protruding from a coral reef, you have no doubt been bitten by the shipwreck bug. If not, it is a trip worth pursuing and one not to be taken for granted; to search for that ultimate shipwreck might just occupy a lifetime.

I never dreamed it would be this hard to find.

Mel Fisher



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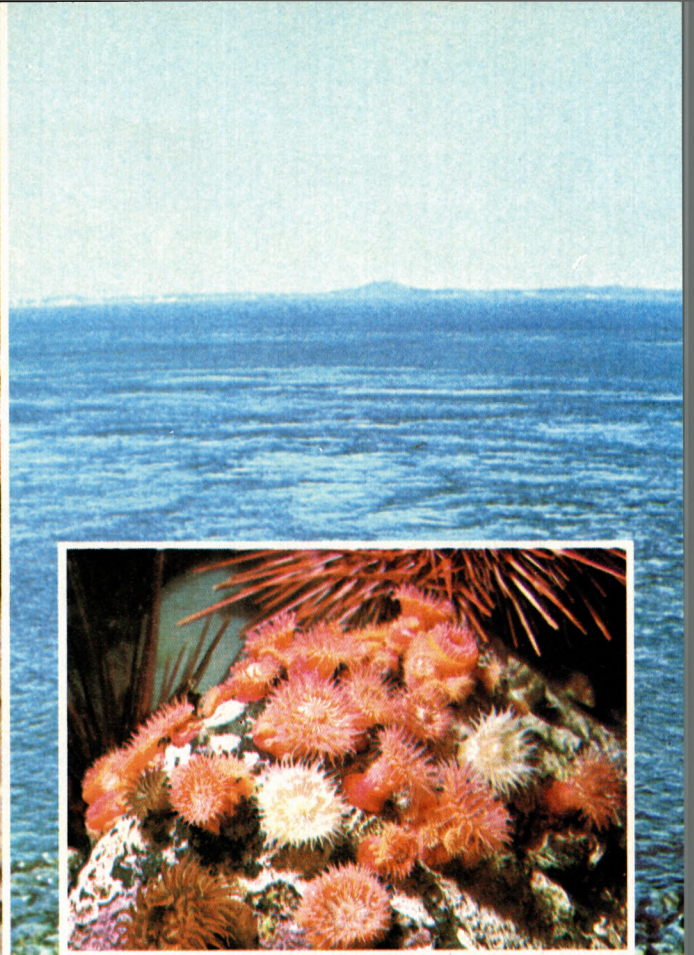
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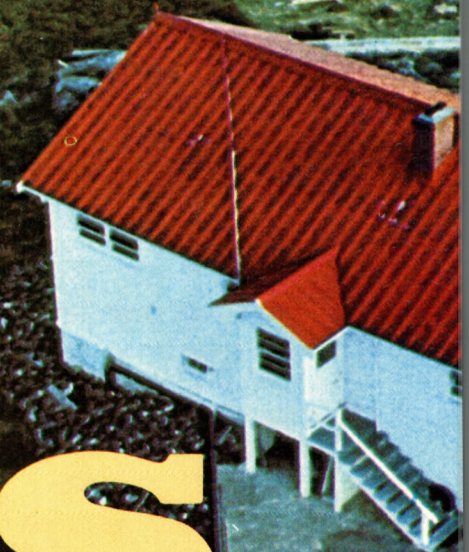
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Strawberry anemones and sea urchins cover the rocks just below the beacon. The large anemone at left is just one of the colorful species that are found in British Columbia.



RACE ROCKS BEACON



Story and Photography by Emerson Mulford

A flashing sentinel of danger for 117 years, the Race Rocks' light signals some of the most exciting diving in British Columbia. Located off the southern tip of Vancouver Island in the straits of Juan de Fuca, Race Rocks were named by officers of the Hudson Bay Company sailing on the *HMS Herald* in 1846. To warn mariners of the swift current and rock-studded waters, a light was placed atop a 105-foot stone tower. The stones are four feet thick and were cut to fit in England. As ballast in sailing ships, the stones were then sailed to the British Columbia coast between 1854 and 1856, construction of the light being completed in 1860.

For the local diver or the traveller this light signals rushing water, clear stills, and generally some of the best diving in British



Race Rocks beacon was built by the British Navy between 1854 and 1860. Its present caretakers, Mr. and Mrs. Anderson, show visiting divers through the historic lighthouse.

Signaling some of the most exciting diving in British Columbia

Columbia. The currents, which average three knots, create an environment where invertebrates of every size, color, and type proliferate, where Stellar Sea Lions bathe in the sun or, curious, dive on the occasional diving visitor.

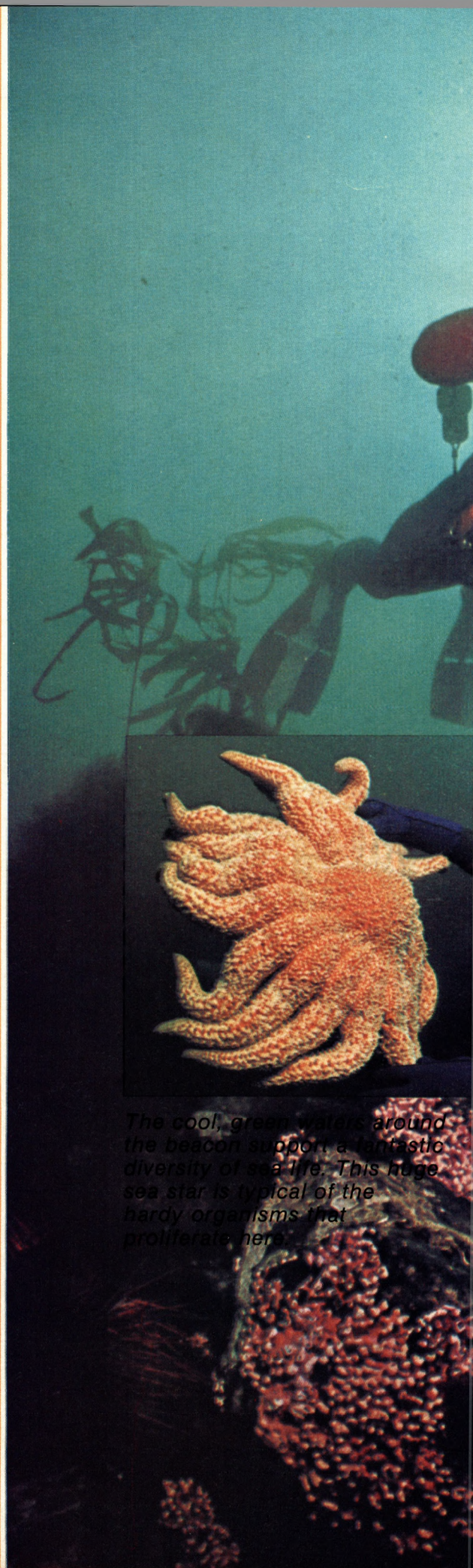
Diving Race Rocks requires a few special techniques; nothing difficult, just a small boat and a good handler. Diving is generally done in two styles. Current runs are, of course, number one. With many currents running as fast as ten miles per hour, you bail over the side up current and simply swim or float through the many channels. In a very few minutes the diver may see as much as a half mile of sea bottom. Photography is somewhat limited by this type, but I guarantee you an exciting dive!

The other style is done on the lee side of the larger rocks in a still area. It's good to keep your boat manned and above you, but here in the stills you can settle down to a more relaxed type of sightseeing and photography.

The invertebrates will absolutely blow you away. Typically, you don't find individual species but rather fields of animals, often intermixed with other contrasting and colorful animals. The photographic potential is unlimited! Because spearfishing is generally frowned upon by the local divers, Rock Cod and Ling Cod are easy subjects for the photo diver.

For me the sea lions were perhaps the most exciting. Having spent many hours in the water with their California cousins I was anxious to see and dive with the Stellar Sea Lions often found on Race Rocks. When first encountered on the surface, they're awesome. Having the same basic shape as the California species, the Stellar Sea Lions are at least twice their size and weight. The smaller females were an easy six feet and probably weighed 350 pounds. The males—Wow! Fortunately, none of the males were curious enough to dive on us.

When visiting Race Rocks don't forget to stop and say hello to the light keeper and wife, Mr. and Mrs. Anderson. Along with their two dogs, the Andersons



The cool, green waters around the beacon support a fantastic diversity of sea life. This huge sea star is typical of the hardy organisms that proliferate here.



live year round on Race Rocks. As we landed at the maintenance dock, Mr. Anderson met us. After an informal introduction we were invited to tour the four-building complex and lighthouse, a tour which turned out to be as interesting and exciting as the diving.

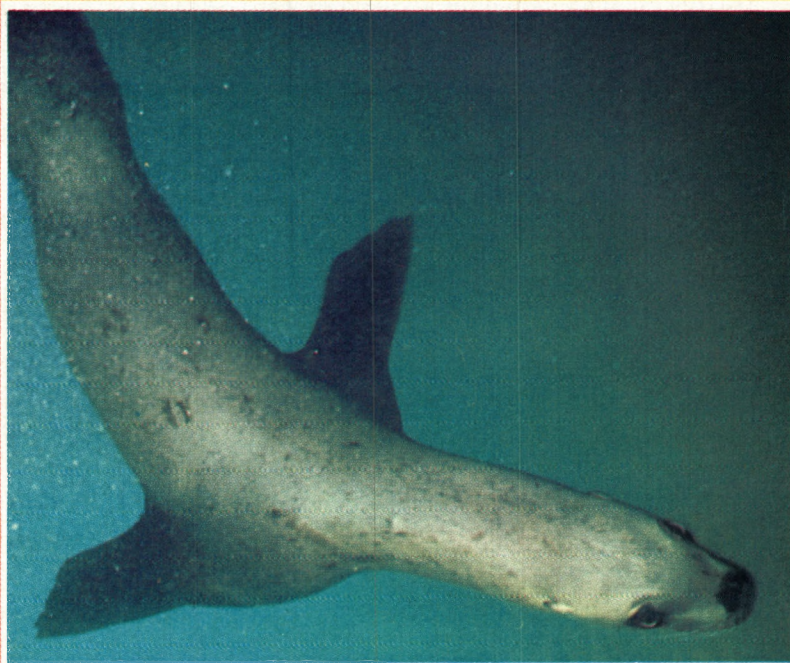
The climax of our landside visit was a trip through the lighthouse. Winding our way up the 105 feet of granite steps turned out to be rough. The walls taper inward and the stairs themselves were only about 18 inches wide and just four inches high. My size 12 shoes just didn't fit.

Once at the top, you crawl up through a small wooden trap door and onto the floor of the light room. As you stand up, you're drawn to the windows and a view that is absolutely beautiful. It's one of those situations where in the first several minutes you take no pictures, then in the following 60 seconds you take a whole roll. No one says anything, you just slowly walk around mumbling to yourself about the view. Mr. Anderson broke the spell, directing our attention to the light as he explained its inner workings.

We crawled through yet another door, this time through the wall onto a catwalk outside the light room. The view was straight down 105 feet, and I quickly took a half dozen more frames, then it was back inside.

It all happened too quickly. Diving and touring Race Rocks in just one day was simply not time enough; it was enough only to realize that I could spend a week in the water and a second week with the Andersons on their peaceful bit of rock. British Columbia is indeed a unique and beautiful part of Canada. For the traveling diver venturing into the Northwest, I would rate Vancouver Island, and in particular Race Rocks, high on my list of places to see and dive; it is some of the very best you'll experience. 

The large Stellar Sea Lions of British Columbia are found on Race Rocks also. Much larger than the California variety, the Stellar Sea Lions are awe inspiring and, fortunately, docile.



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IN THE NEWS

continued from page 57

temperatures up to 111 degrees Fahrenheit. The normal temperature of the Red Sea is 72 degrees. In these same unique areas the sea water is eight times saltier than the Pacific Ocean off southern California, and even saltier than the Dead Sea.

Wax Beans Could Save Whales

Tiny wax beans from a wild desert plant may be the world's best insurance against the eventual extinction of the giant sperm whale.

So contends an article in *Sea Frontiers* Magazine, published by the International Oceanographic Foundation. The IOF operates Planet Ocean, a popular tourist attraction and science showcase on Miami's Rickenbacker Causeway.

Writer John H. Harrison claims that a liquid wax from the jojoba bush which grows in California, New Mexico, and Arizona is "not only just as good as sperm whale oil, it's better".

Whale oil is used commercially in lubrication and transmission fluids, cosmetics, carbon paper, pharmaceuticals, candles, and wax-based polishes.

The killing of whales anywhere by American citizens has been banned since 1972, but as many as 27,000 were estimated to have been killed in the 1976-77 season by the fleets of Japan, Russia, and other nations. Nearly 12,000 of these were commercially valuable sperm whales.

"By displacing sperm whale oil on the world market," Harrison writes, "jojoba bean oil could not only save the sperm whale from extinction, but might help save other whales by literally forcing the whaling industry out of business."

"Jojoba wax has no fishy smell or taste, and it is produced by an exceptionally hardy plant with a life span of perhaps 200 years and with high resistance to insects, heat, cold, and drought," according to Harrison.

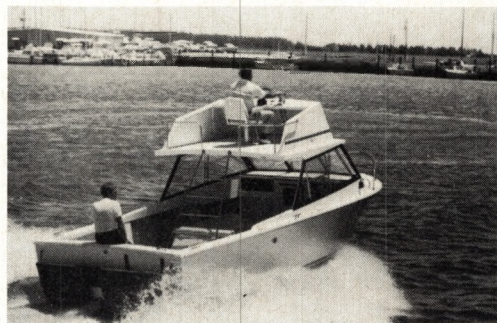
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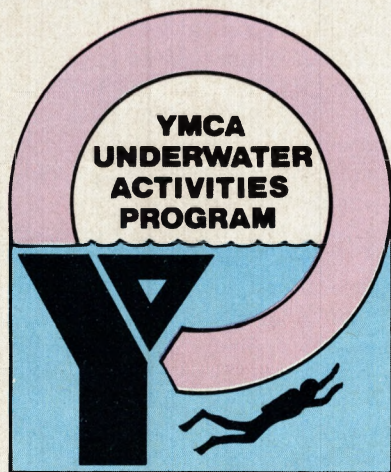
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The convention will kick off with a poolside luau on Friday evening, April 14, and as an added bonus a film festival will be presented Saturday night.

The week following the convention six dive trips will be available, including a periodically-submerged visit to the National YMCA Center for Underwater Activities in Key West, Florida. Also the National YMCA Swimming and Springboard Diving Championship will be held at the Swimming Hall of Fame in Ft. Lauderdale, Florida, on the days following the convention.

The 4th Annual, National YMCA Underwater Activities Convention

Open to all divers and their guests, will be held at the famous Deauville Hotel on Miami Beach, April 14, 15, and 16, 1978. Rooms at the hotel will be available to registered participants for only \$12.00 per night (double occupancy).

1. A series of workshops on YMCA programming will be held, sequentially. Each workshop will be approximately two hours in length. All workshops will be held in one room, and they will not overlap so far as time is concerned. This will allow time for workshop participants to attend other convention activities.
2. A sequential series of technical papers on the YMCA program and aspects of diving which are of general interest to the diving public —instructors and divers alike.
3. A series of entertaining slide presentations of general interest to the diving public. These will be conducted sequentially in a third room at the same time papers and workshops are under way.
4. The National YMCA Underwater Competitive Championships Underwater Hockey will be conducted just offshore of the Deauville throughout both days of the convention.

**Miami Beach
April 14, 15, 16, 1978**

For further information, contact:

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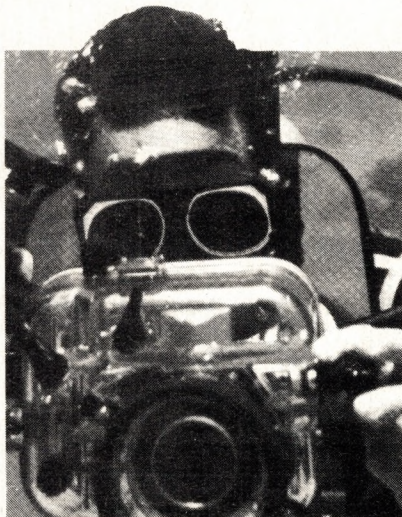
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P.A.D.I. "Women In Diving Seminar": A Giant Stride for Women Divers



By Karen Strauss

November 11, 1977, Santa Ana College, California, on a bright, sunny Saturday morning an event of significant importance occurred in the diving community. A panel of distinguished specialists told the woman diver where she could go (in diving) and how to get there.

Being an upbeat, forward-thinking seminar, women divers were regaled with facts, percentages, and insights concerning past and present female contributions to the state of the art. It was a positive, confidence-inspiring day.

The morning's first speaker, Zale Perry, is herself a pioneer in the development of scuba in the United States. She is currently documenting the history and development of scuba in this country in a soon-to-be-published book entitled *Scuba America*.

Zale gave us special insights into the forces motivating the female skin diver of the early 50's and 60's. It was a special woman who, in that era, overcame social pressures and learned to dive with her man instead of waiting for him patiently on the beach.

Hillary Hauser, author of the book, *Women In Sports: Scuba Diving*, and contributing editor at *Skin Diver Magazine*, documented with a slide presentation the careers of several outstanding women divers. Among them, Valerie Taylor, self-appointed guardian to an extraordinary variety of sea creature "pets", Eugenie "The Shark Lady" Clark, and Sylvia Mead, a marine algologist and undersea habitat dweller.

Referring to himself as the token male on the program, Bruce Bassett, PhD., reported on his research of the incidence of decompression sickness among women in aerospace medicine. He elaborated on testing accuracy and the resulting controversy provoked in part by comparing decompression sickness percentages of men and women.

Susan Bangasser, PhD., discussed her research involving physiological concerns for women scuba divers. She surprised many of us with the news of our early chilling in cold water, pointing out that the average woman's larger surface

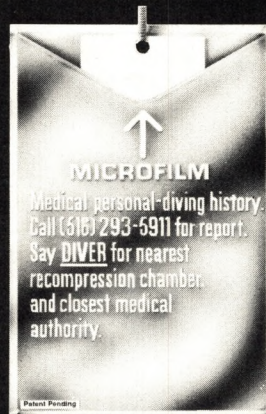
area as compared to the smaller body mass is conducive to heat loss. Her presentation also covered pregnancy (be prudent and limit yourself to 33 feet or less), the pill (avoid deep and/or decompression dives), and diving during your period (no reason not to, unless you feel under the weather).

After lunch break, *Sea of Eden*, a film by Al Giddings documenting the Palauan Islands as seen through the masks of female and male sport divers, was screened.

Eleanor Crown, PhD., Michigan Sea Grant Program, shared her survey results of women divers in the mid-west. Her presentation reinforced a fact generally assumed, many women become involved in sport diving to follow in the footsteps of a man who is important in their life. However, once involved in the sport they exhibit tremendous interest and soon match their male peers in enthusiasm. One disturbing aspect of this rampant enthusiasm is the lack of expert guidance from medical authorities on diving physics as related to female physiology. Major decisions regarding health and safety underwater are made by every female sport and professional diver without the benefit of authoritative information.

continued page 142

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Washington Currents

By Philip Z. Trupp



New Dive Tables in 1978

Washington is moving ahead on a new set of compressed-air dive table allowing more bottom time and faster decompression.

The effort is part of a \$3.5 million recommendation made earlier this year by the National Advisory Committee on Oceans and Atmosphere, headed by Virginia Institute of Marine Science Director William J. Hargis, Jr. The recommendation was sent to Congress and the White House.

Navy and National Oceanic and Atmospheric Administration (NOAA) experts are spearheading the research, with the results likely to reach the sport diving community by mid-1978.

The effort is long overdue. Private industry, mostly big oil firms, have formulated exotic tables allowing divers in search of black gold to descend beyond the 2,000 foot level on mixed gases. Many of these closely guarded tables are "experimental". But with Washington getting into the act, more information will be generated and some of the uncertainties removed.

While the government's research is geared primarily to deep sea work and the push for more abundant ocean resources, a sizeable portion of the program will involve open circuit air diving. Benefits to sport divers will accrue in more bottom time, and, we hope, fewer of those nasty bends cases we've been hearing about lately.

Sport Divers Escape Regulation—Again!

It has been learned that U.S. Coast Guard officials will exempt sport divers from regulations designed to promote safety in the complex world of commercial diving.

Recently, sport divers successfully avoided ill-advised attempts by the Labor Department's Occupational Safety and Health Act task force to slap scuba instructors operating in an employment capacity with an unrealistic safety code more suitable to off-shore oil rig operations. There had been some apprehension the Coast Guard might try to pick up where OSHA had failed.

But, according to NAUI's Washington legal counsel, John R. Wenzel, the Coast Guard has been far more understanding than OSHA's dry bureaucrats. Wenzel, who represented the sport industry's case against OSHA, said "things have quieted down a bit". However, government intervention remains a threat, he warned. For instance, university research divers won't come under Coast Guard jurisdiction but OSHA will be breathing down their necks.

Wenzel said the time has come for the sport industry to build a "war chest" for future government onslaughts. Recalling the high cost of the scrape with OSHA, Wenzel said there is no doubt attempts to regulate sport diving at federal, state, and local levels will continue, "and probably become even more burdensome than in the past."

He said if the Consumer Protection Agency is given the congressional go-ahead, "we can expect a new mass of regulation and paperwork."

The war chest idea has been taken to heart. PADI's Dennis Graver has suggested dive shops place a March-of-Dimes-style container near air fill stations with a pitch to contribute a quarter to a "diving defense fund" with every air fill.

NASDS has proposed a "legislative hot line" for its store/schools. Another idea is to establish an industry strike force which can react to federal action on quick notice.

Robert Smith, National Director of the YMCA's underwater programs, believes the real problem is the individual diver's failure to perceive the regulatory threat. Maybe it's time to do some hard thinking about it—now that we've been given some temporary breathing space.

Weicker Pushing for More Ocean Awareness

Senator Lowell P. Weicker (R.—Conn.), Washington's Capitol Hill dive leader and mover behind the influential Congressional Underwater Explorers (the CUE Club), is moving ahead on new legislation mandating physiological and technical studies on diver safety.



Sen. Lowell Weicker (foreground) snaps photos within range of Hydrolab.

According to Bob Wicklund, Weicker's on-the-job fisheries biologist and Hydrolab Project Director, the Senator's legislative program will have solid spin-offs for the sport diver. Included would be interaction between federal agencies and private organizations in developing new techniques and equipment safety procedures. Sea Grant funding also holds high priority on Weicker's list.



Pushing for Ocean Awareness: Sen. Weicker.

The Senator, who two years ago had his eyes opened to the sea during a Hydrolab saturation dive in the Bahamas, will rededicate the refurbished habitat, which has been placed in 50 feet of water off St. Croix. He plans more saturation diving.

More than once Weicker has declared the "oceans are the future of the world". And, according to Wicklund, he remains firmly committed to that proposition. Weicker, in addition to his saturation dives, has taken time out to get wet in the Virgin Islands.

"By now he's an experienced diver with plenty of first-hand stories to tell," Wicklund said. This places Weicker one-up on a lot of dry Washington lawmakers who talk about the sea but haven't bothered to explore it.

Fortunately, there are at least seven other congressmen and senators doing it deeper and more seriously these days. They are: Rep. John Murphy of the important House Merchant Marine and Fisheries Committee; Rep. Bill Alexander (D.—Ark.); Rep. John Breaux (D.—Ala.); Rep. Bill Young (D.—Fla.); Rep. William Dickerson (D.—Ala.); Sen. Ernest Hollings (D.—S.D.); and Sen. S. I. Hayakawa (D.—Calif.).

Now—if only we could get Congressmen Dingle and Johnson wet, we could quit worrying about the unfair extra tax on sport diving gear these two gentlemen claim is necessary to help bolster a sagging U.S. fishing industry.

Emergency Ascent Standard

Heads of the major certifying agencies met here in December hoping to reach a "consensus" on the tricky issue of emergency ascent training.

The gathering was conducted under the watchful eye of the Undersea Medical Society (UMS).

A number of physicians have expressed concern over the possible dangers of continuous exhalation ascent exercise. The certifying organizations, sensitive to the medical aspects, have taken divergent approaches.

What is needed is a single, workable standard.

Controversy surrounding the subject couldn't be more confusing. Some training groups claim it's safer to ascend on your own in an emergency. They point to troubling statistics which indicate buddy breathing is simply too risky. As a result, some instructors believe your buddy may be your worst enemy.

Dr. Chuck Shilling, UMS Executive Secretary, said he's disturbed to find so many open water embolisms being recorded. He indicated this may in part be due to the failure of training agencies to agree on an emergency standard. It is time to stop bickering, he said. "The certifying agencies are going off in all different directions. And it doesn't do any good to shy away from the problem."

Dr. Shilling said about one out of 1,000 basic scuba students runs into trouble during an emergency instruction. Those odds, he said, aren't high enough to avoid such training.

"We're looking for a consensus," said Dr. Shilling, who once conducted 87,000 emergency tests for the Navy—without a single accident.

It's time we realized the need for a safe, approved method all the agencies can live with.

A report on the meeting will be published in February.

Uncle Sam May Need You!

Certain federal officials are thinking of ways to link sport divers to government and/or university ecology programs.

A solid plan hasn't evolved, but the climate for such a hook-up is now being quietly discussed. So far it's little more than an idea.

However, dive clubs around the country soon may be approached. If response is positive, federal, state, and local governments may be willing to supply equipment for undertakings such as pollution samplings.

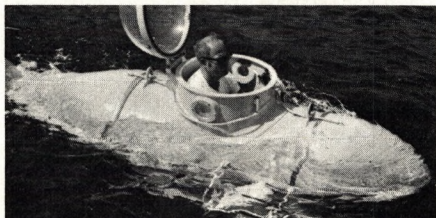
"We're hoping for a good response," a Washington official said. "We believe scientists and sport divers have a lot to share that will benefit all of us."

So if you'd care to do more than sightseeing on the bottom and are interested, drop a line to *Sport Diver*. Let us know how you feel, we'll get your message through.

Ready for a Sub?

Retired Navy Captain George Kittredge's one-man dry sub can be purchased for about \$10,000—placing it within range of well-heeled sport clubs.

Sea Grant officials are impressed by the sub's price tag. Recently the



LeSchack cruising in his sub.

Washington-based Development & Resource Transportation Co. (DRT), an ocean and geophysical research firm, began preliminary cost-sharing arrangements with the Florida Institute of Technology to test DRT's sub in the Bahamas.

DRT will outfit the submersible for oil data gathering work under the Arctic ice. It also will seek out oil spills which gather beneath the ice pack.

FIT believes the sub may be useful as a training and research tool for its students. Dr. Norbert O'Hara, head of FIT's Oceanographic and Ocean Engineering Department, said low cost makes the sub most attractive.

DRT President Len LeShack believes the vehicle is within reach of many dive clubs and university groups. While LeShack hopes to lease his machine to oil firms, he said it may be a natural extension of a sport diver's capabilities.

The sub may be outfitted with a variety of off-the-shelf gear and is ready for adventures down to 250 feet. Information may be obtained from Captain Kittredge, Warren, Maine.

Ocean A-Bomb

While east coast wreck divers await the outcome of a charter boat group's suit against New York and New Jersey for allowing pollution to become a serious navigational hazard, Washington apparently is listening closely as the prestigious National Academy of Sciences suggests high-level nuclear wastes be buried on the seabed.

The suggestion follows three years of investigation by Woods Hole Oceanographic Institution. Woods Hole apparently has failed to identify "valid" scientific reasons for avoiding burial of radioactivity in an already perilously threatened sea. Possible burial sites already have been charted off the east coast.

It's been hinted seabed disposal is more a matter of politics than science. Frustrated by public interest groups which oppose land burial, the so-called "seabed option" sounds attractive to more than a few bureaucrats.

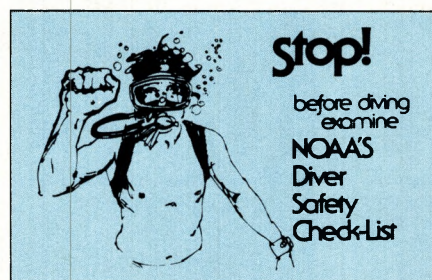
So far, the Carter Administration has been reluctant to discuss the issue. But even the less secretive folks in Washington won't venture a guess on what might happen if the seabed option—which researchers claim will render the radioactive wastes safe for a million years—doesn't conform to theory.

We should remind ourselves that commercial pollution is bad enough. Consider the potential consequences of a government program to place the left-overs of total destruction on the ocean floor. Of course, a million years of safety is a wide margin, but if the human race lasts, we may be the promulgators of a grim future policy: bury it today, die tomorrow!

Freebie for Safety

You may obtain free of charge from NOAA a wallet-sized card listing a before, during, and after dive safety check list. The card has helpful hints and reminders, space

for your name and the phone number of the nearest chamber facility. If you'd like one of the NOAA Diver Safety Check List Cards, write to NOAA Public Affairs, 6010 Executive Boulevard, Rockville, Maryland.



Revised Manual from NOAA

Once considered too complex for basic scuba instruction, the *NOAA Diving Manual* is being revised and updated. The revisions may qualify this outstanding publication for basic and sport diver courses.

Dr. James Miller, Deputy Director, Manned Undersea Science and Technology in NOAA's Office of Ocean Engineering, said the new book will contain expanded sections and much simplification, along with new altitude dive tables and fly-after-dive procedures.

The table work incorporates studies now underway using foreign data, which in many cases varies significantly from the standard U.S. Navy air tables. Dr. Miller said the Navy is cooperating in the effort.

A new first aid section will be added and Dr. Miller promises techniques and precautions to be used when diving in polluted waters.

"We're facing increased pollution hazards," Dr. Miller said. "We've got to be in a position to isolate divers and their equipment from its harmful effects."

The manual will be off the presses next year, and according to Dr. Miller, it will be a good deal more comprehensible to those who dive for fun.

Meanwhile, he said the agency will continue support of the University of Rhode Island's scuba accident studies and sponsor a series of meetings between sport divers, equipment manufacturers, instructors, and others participating in recreational aquatics.

Trick or—"The Deep"

In a town where everybody's gotta have a gimmick, a large dive shop cornered the latest rage—rent a wet suit, mask, and flippers for Halloween. The wet suit, it was reported, kept the trick or treaters warm enough. But those who wished to go another route wore a wet tee-shirt, a *la* Jacqueline Bisset. That was D.C. Halloween. Still doesn't top Richard Bailey's spray-on swimwear!

Philip Z. Trupp is a diver, author, and investigative reporter with 18 years of Washington news gathering experience for major publications. He is an outer space buff, an innerspace explorer, and Sport Diver's eye on Washington's underwater world.

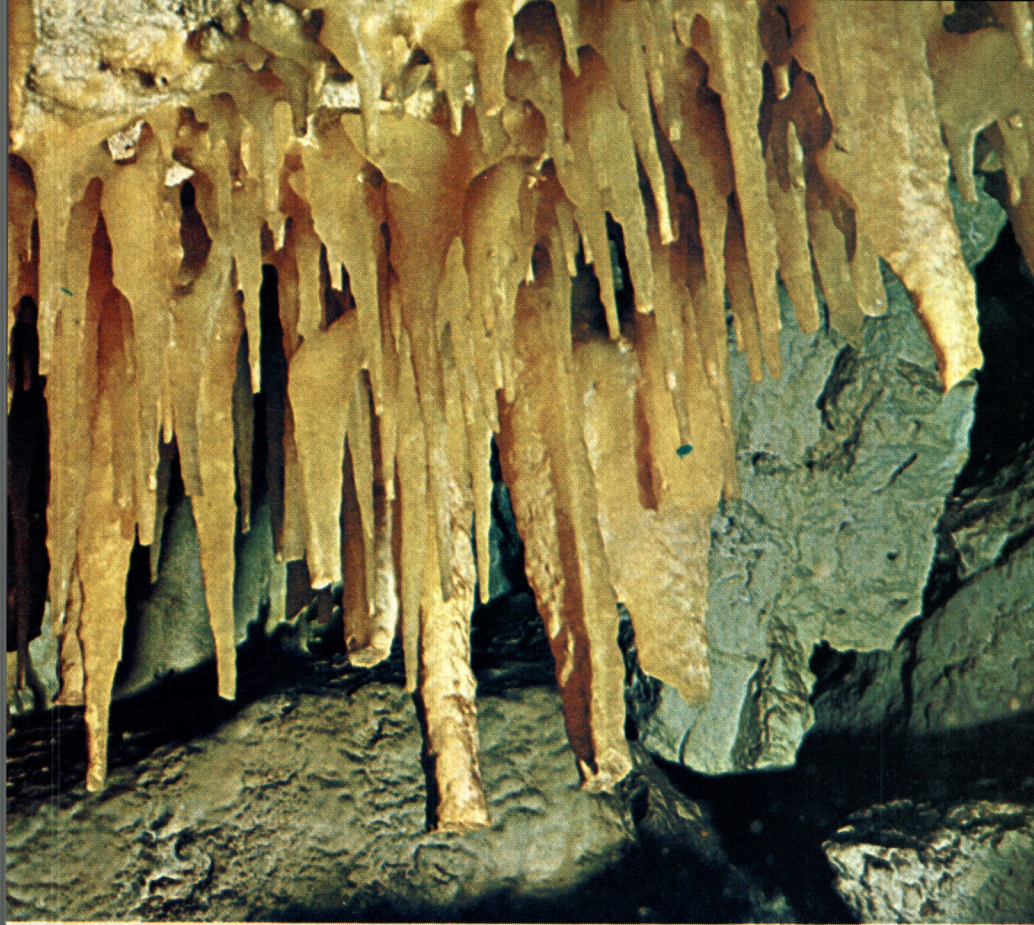
Blue Hole Diving

article and photography
by john larsen

When a cave opening occurs in shallow water, the color of the deeper water in the cave opening is blue in sharp contrast to the light green coastal waters. In the Bahamas, these cave openings are called blue holes. Bahamian blue holes are solution caves formed in sedimentary limestone rock which makes up the Bahama Bank. The Bahama Bank has been exposed and flooded several times when water was stored or released during recent glaciations. When, in the Ice Age, great amounts of

Blue holes are solution caves that formed in the Bahamas Bank during the Ice Age. Many of these caves have very clear water, both salt and fresh, in them.





the Earth's seas were frozen in the huge ice packs that covered much of the Northern Hemisphere, the sea level dropped drastically, sometimes as much as 300 feet below present levels. This exposed some land which is now covered by water. When the Bahama Bank was above sea level the process of limestone solution formed the caves and the beautiful stalactites, stalagmites, and travertine deposits in them.

The porous limestone bank in which the caves were formed was riddled by the solution process creating a sort of limestone sponge. This "sponge" is saturated with sea water, which allows hydrostatic pressure to be freely transmitted *through* the islands' land mass. Quite often the hydrostatic pressure is unequal on opposite sides of the islands, due to tidal delays. The islands are the exposed tops of the Bahamas Bank. On one side, the land trails off onto a very expansive shallow sea floor, while the other side drops off sharply to deep water. The resistance of the water flowing onto and off of the shallow bank causes a delay in the turning of tides. Often this delay is several hours, and ocean tides and shallow side tides almost never coincide.

The deposits in blue holes are the same types found in dry caves because at the time they formed, the blue holes were dry. Ben's Cave (middle photo, inset) is a popular blue hole near Freeport. At left, the diver's fins are blurred by saltwater as he hovers at the halocline level in a blue hole.

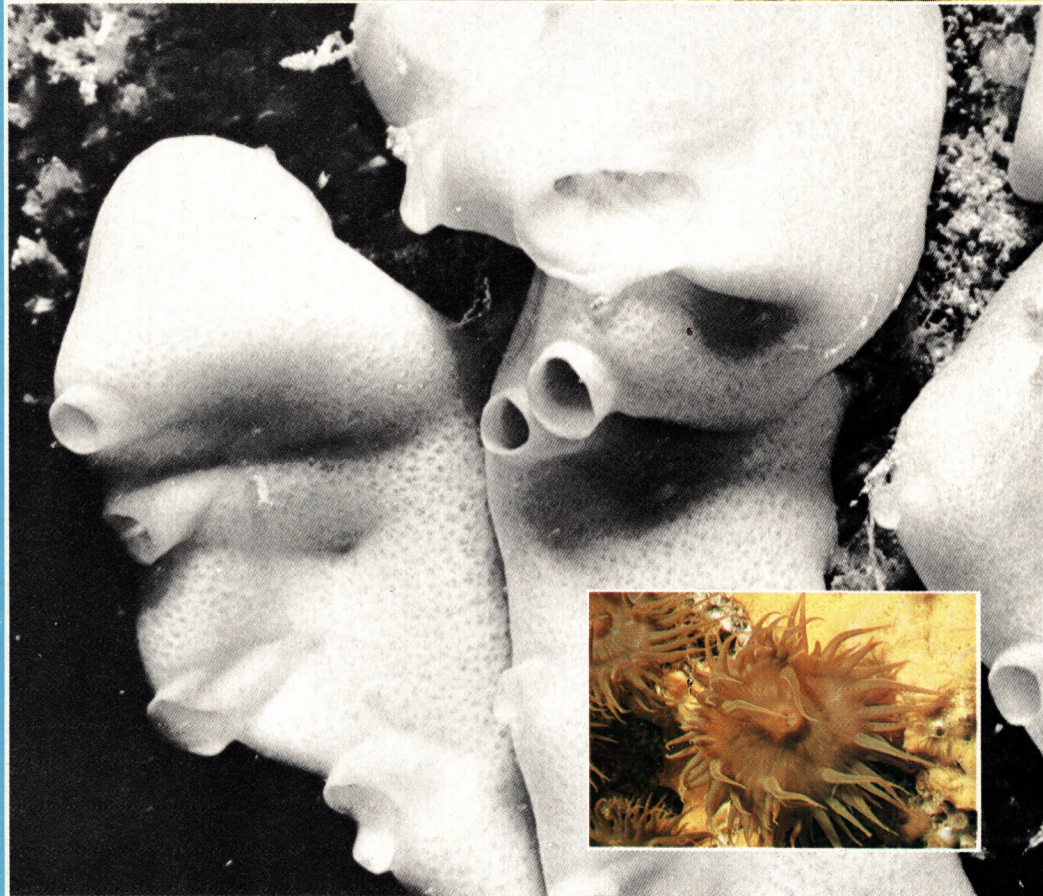
The result is unequal tidal levels on opposite sides of the island. On Grand Bahamas, the blue holes, because of the tidal delays, reverse their flow four times each day. Blue holes on the shallow north shore will exhibit an excurrent while south shore blue holes exhibit an incurrent.

Factors affecting tidal delays are complex and can complicate this picture. According to a paper by Dennis Williams, three out-of-phase tidal levels cause a blue hole near Great Abaco to excurrent continuously. By knowing the time of high and low ocean tides in conjunction with the exact time of the delayed tides on the shallow side, it is possible to accurately predict the time at which a blue hole's current will stop and then reverse its flow. With this information, cave divers can plan to enter the cave at slack current just prior to the beginning of the excurrent phase.

The current in a blue hole can be very strong, usually exceeding the ability of a diver to swim against it. This can result in an unsuspecting diver blowing out of the cave in an uncontrolled boiling ascent, or being sucked into the cave's opening unwittingly.

The tremendous suction at the opening

A number of marine organisms live in the blue holes. Both salt and fresh-water fish are found, as well as crabs, soft coral, and sea anemones. The blue holes have at least one mythical inhabitant, the Lusca. According to Bahamian legend, the Lusca is responsible for the tremendous suction at the mouth of blue holes when water is entering the cave.





of some blue holes during maximum incurrent has given rise to the myths of a blue hole monster, the Lusca. Small boats, motors, and other objects have been sucked into blue holes, and Bahamian legends blame the Lusca for their disappearance.

On most Bahama islands a layer of fresh water floats on top of the sea water in the porous rocks and caves, providing the island with its fresh water supply. Some inland caves have both fresh and salt water in them. The dividing line between the two layers is called a halocline. At the halocline, a diver can clearly observe the two distinct layers of water, which remain separate if undisturbed. When the salt and fresh waters are mixed, because they are of different densities, vision at the halocline level is severely distorted. The result is like diving without a mask. Above and below this mixed layer the visibility remains crystal clear, and in time a sharp

halocline division will again develop. The two layers are of different temperatures also, with the fresh water on top being 3 to 4 degrees cooler than the brackish water below.

Swimming through the halocline, the color and appearance of the cave changes abruptly. In the fresh water the cave walls are brilliant white or amber. In the salt water they are dull brown with considerable organic sediment. Bats live in some of the caves, and their droppings cover the cave floor. A few fresh-water fish live in the fresh-water layer, while many salt-water species such as the Gray Snapper swim freely between the two layers.

The cave walls in the salt-water layers are eroded and are studded with fossilized conchs and other mollusks. When stopping to observe these fossils, the percolation of exhaled air bubbles causes considerable siltation, and often there is no current to flush the silt away, especially in the inland caves. In Ben's Cave on Grand Bahama, there is no flushing by current. There is vertical tidal movement, but very little incurrent or excurrent has been observed.

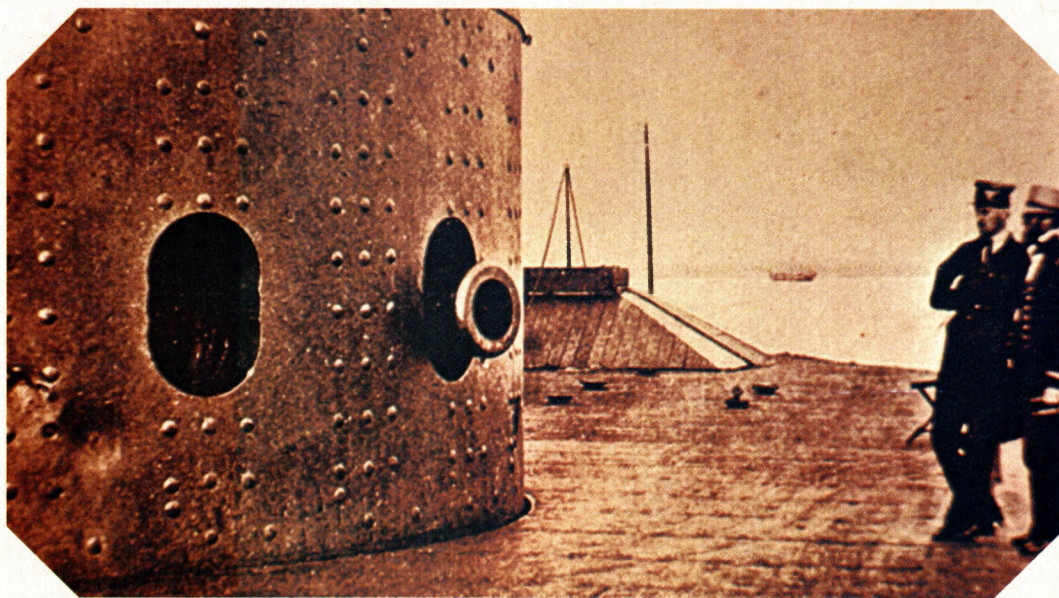
Near Ben's Cave, in a cave called the Lucayan Burial Mound, seven intact skeletons were found. Unfortunately, the bones were collected and removed by treasure-seeking sport divers, and a very

continued page 142



SALVAGING THE PAST

THE MONITOR



SLEEPING GIANT

by BEN WILSON with JIM McMAHON and HOWARD RATSCH

PROLOGUE by KATHY BENTLEY

The news reached Washington at 3 a.m. March 9, 1862. The C.S.S. Virginia had won a decisive victory at Hampton Roads, Virginia against five Union frigates. Worriedly staring out of a White House window, President Lincoln listened as Secretary of War Edward Stanton paced the floor, shouting, "Nothing can prevent her destroying every navy vessel, laying Washington in ashes, and then placing the seaport cities under contribution. I have notified the governors

to protect their cities; we can do nothing for them. Why, sir, it is not unlikely that we will have from one of her guns a cannon ball in this room before we leave it."

Ironically, the C.S.S. Virginia was once the Union frigate Merrimac, burned and scuttled at the Norfolk Navy Yard by the Union to prevent her falling into Confederate hands. It took only an inventive young Rebel officer named Brooke to raise the Merrimac and build a deadly floating battery,



protected by iron plate, on her deck. When the Merrimac left dry dock, she looked like a turtle with a smokestack on top, but in all the navies of the world there were not more than two ships that could have given her a fight. The French Navy had an ironclad frigate, and the British another; all the rest of the world's warships were of wood. She was christened Virginia.

Fortunately for the Union, in the Fall of 1861, John Ericsson, a Swedish immigrant, had paid President Lincoln a visit. He had offered to design and build an ironclad warship capable of wrecking the Rebel fleet in Norfolk. With Ericsson's model in his hands, Lincoln said, "All I have to say is what the girl said when she put her foot into the stocking. It strikes me there's something in it."

On October 25, 1861, Ericsson began construction on the U.S.S. Monitor. But now, months later, a Rebel ironclad was steaming about the President's backyard, sinking Union warships at will, and there was no Union ironclad to oppose her. Unknown to the President and Secretary Stanton, Ericsson's Monitor had been launched in New York on Inauguration Day, and had arrived at Hampton Roads just after the Virginia had retired for the day.

The Monitor was just as odd looking as the Confederate vessel. She had a long flat hull, and amidships was a revolving iron turret that mounted two 11 inch guns. Aft of this was a smoke pipe, and forward there was a stubby iron pilot-house. With the water line so low, it seemed any passing wave might sink her, and most people said she resembled a tin can on a shingle, or a cheesebox on a raft.

On the very morning that Lincoln stood staring fearfully out of the White House windows, the Monitor steamed into Hampton Roads, and came to the side of the stranded U.S.S. Minnesota. At dawn, March 9, 1862, the C.S.S. Virginia came out to finish the Minnesota, and the tiny Monitor sailed straight at her. Federal troops cheered when the little raft-like Union vessel came at the big roof-shaped Confederate. Rebel sailors on the Virginia laughed at this David, challenging their Goliath, two guns to ten. Why, one shot ought to sink the tiny thing. Although the battle began at a mile range, the two ironclads gradually closed the distance until they were 100 yards apart, sometimes scraping up against each other. Lieutenant Catesby Jones, acting Captain of the Virginia,

ordered broadside after broadside hurled at the little Yankee, but most of the Rebel shot screamed harmlessly over her low silhouette or rattled off her turret like pebbles. Monitor's iron "cheesebox" spun around and two heavy guns appeared from the formerly covered ports. Two thunderbolts struck the Virginia's casement, a blow so violent that every man on that side of the ship was dashed to the deck with blood running from nose and ears. The Virginia swung around firing her bow gun, but the Monitor, her turret whirling, fired again and again. A gray haze of defeat mingled with the powder smoke hanging heavy in the Virginia's casement; every man in her waited for the shot that would kill them all. As the Monitor turned aside for a moment to change helmsmen (gallant Captain Worden had been blinded by a powder burst at the window of his pilot-house) the wounded giant turned tail and fled back to her wharf at Norfolk. The Monitor did not try to follow, nor did she attempt to force a finish to the fight.

History's first contest between ironclad battleships had ended in a draw, although both sides claimed victory. Eventually the Confederacy was forced to blow up the Virginia to prevent her from being captured, and with her passed the South's chief threat to Union naval supremacy. Later the U.S.S. Monitor supported General McClellan's Peninsular Campaign to capture Richmond.

Although neither ironclad was afloat at war's end, they had effected for all time momentous changes in naval tactics and ship construction.

The short career of the Monitor ended on December 31, 1862. While under tow by the steamer Rhode Island, the Monitor foundered in heavy seas off Cape Hatteras en route from Hampton Roads to Beaufort, North Carolina. The Rhode Island's log recorded the last moments of the Monitor's crew and the ironclad they abandoned: "Lowered Scorpion, succeeded in getting crew off except 16 men and officers — sent first cutter in charge of Mr. Brown for them — at 1:30 lost sight of the Monitor light; we, being unable to turn our wheels on account of the boat discharging the crew of the Monitor, hoisted up Scorpion and proceeded to windward in search of the first cutter and Monitor, but not finding them, steamed to windward to hold our position until daylight, burnt Costons signals every half hour."



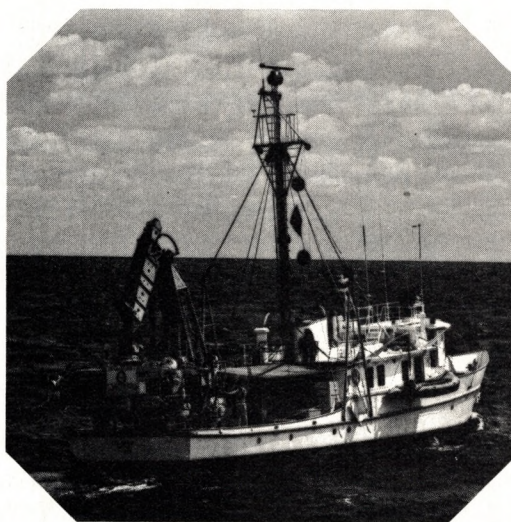
The *Monitor* now lies in 220 feet of water 16 miles southeast of Cape Hatteras, off the North Carolina coast. In late July and August, 1977, submersibles from the Harbor Branch Foundation, Inc., located at Link Port, Florida, arrived to carry out photogrammetric surveys of the wreck in cooperation with the National Oceanographic and Atmospheric Administration (NOAA).

As the vessels *Sea Diver* and *Johnson* stood by, submersibles *Johnson Sea-Link I* and *Johnson Sea-Link II* were preparing to lock out Harbor Branch diver Gene Melton on the historic wreck. Edwin A. Link, Harbor Branch Vice President and designer of the *Johnson Sea-Link* submersibles, paced the deck of the *R. V. Johnson* with Operations Director Roger W. Cook. Both knew it would be a tricky job for the men below.

Because of the confluence at the wreck site of two currents, the Gulf Stream and an offshoot of the Labrador Current, the sea here is treacherous and is known to sailors as "the graveyard of the Atlantic". *Johnson Sea-Link* pilot Jeff Prentice said, "At any time the conditions here depend on which current is dominating, the Gulf Stream or the Labrador, and the conditions can vary unbelievably in a very short time. The visibility underwater can drop from 150 feet to five feet, and the surface change from a total flat calm to eight foot seas in a matter of hours."

The first day on site had been a Gulf Stream day; visibility in excess of 150 feet with warm waters but a rough surface. The team sent down the *CORD* vehicle, a remotely controlled unmanned submersible equipped with a video camera, to reconnoiter the area. The result was an exciting and thorough overview of the *Monitor* wreckage. Before the heavy seas forced the retrieval of the *CORD*, views of both sides of the ship and close-ups of some of the more prominent features were recorded on video tape. Unfortunately, this was the only clear footage obtained of the whole site because visibility during the rest of the mission averaged less than 30 feet. The main mission of the *CORD*, however, was concerned with the divers' safety. During World War II the Navy depth charged the *Monitor* under the impression that it was an unfriendly submarine, and it was feared that some undetonated explosives might still be in the area.

When none were found, Gene Melton was scheduled to do a preliminary survey lock-out dive, the first ever attempted on the *Monitor*. Despite weather conditions, it was a great day for Gene. He not only got photographs of the



Photographs courtesy of Harbor Branch Foundation, Inc.

wreckage, but became the first man to touch the deck of the famous battleship since it turned turtle and plummeted to the bottom on that stormy New Year's Eve 115 years ago.

On the next dive, Harbor Branch diver Richard Roesch began laying a baseline and marking out lanes for the photogrammetric survey. Thirty-nine lanes were laid out, and each was run three times. The *Johnson Sea-Link II* equipped with a Benthos stereo camera system passed over the *Monitor* 117 times, taking some 5000 photographs of the wreckage. The cameras were then repositioned to photograph the sides of the wreckage. When assembled in mosaic fashion by U.S. Navy experts, the result will be a three dimensional view of the ship. This view will be used by archaeologists, engineers, and salvage experts in determining whether or not it will be possible to raise the *Monitor* and restore her.

Why should all of this attention be focused on one sunken ship when there are literally

To aid NOAA in the mapping of the Monitor wreckage the Harbor Branch Foundation of Link Port, Florida brought the vessels R. V. Johnson and Sea Diver to Cape Hatteras carrying the two Johnson Sea-Link submersibles. With their unique maneuverability and diver lock-out capabilities, the Johnson Sea-Links were ideal for carrying out the photogrammetric survey. The Harbor Branch divers often work using the Bio Marine rebreather apparatus (below top), a complex mixed gas, closed circuit rig. The turret of the Monitor (below bottom) was displaced when the vessel hit bottom. It now holds up one side of the wreckage.



thousands of others buried along the outer banks of North Carolina?

For the divers it is high adventure and risk in a treacherous piece of ocean. For others, historians and scientists, the information gained from the whole project of recovery and restoration may provide as yet unknown benefits, much as the space program has.

The simple lure of discovery first attracted such people as John Newton who, after seeing the Monitor for the first time from the *Johnson Sea-Link I*, said "I looked through the porthole and there was the turret looming way overhead. I could see every little anemone, every piece of attaching organism hanging from the turret. Then as the sub lifted off the sea floor and looked down on the turret, I could see the hatch through which the men entered, and I could see what was an axle, it's really amazing to see all that!"

Four years after its initial discovery, John Newton saw first-hand what he had first glimpsed on a sonar screen aboard the research vessel R. V. *Eastward*. Many of the first members of the *Eastward* crew continued on later voyages to the Monitor by ships like the *Alcoa Seaprobe* and the *Cape Henlopen* to explore the wreck and its environment. All these people have given generously of their time to the Monitor project. Without the expert guidance and active participation of Dr. Harold Edgerton, inventor of the strobe light and the Benthos cameras- the underwater photography of the site would probably not have been possible. He was on hand last summer, making several dives in the *Johnson Sea-Link* submersibles. So was Gordon Watts, marine archaeologist for the State of North Carolina, whose expert judgment helped identify the Monitor on the *Eastward* voyage and those following.

On Gene Melton's first dive *Johnson Sea-Link* pilot, Tim Askew, located and identified one of the Monitor's navigational lanterns approximately 40 feet from the hull: "I was just bopping towards it (the Monitor) when I saw this thing on the bottom. I said 'I'll bet that's an artifact.' Gene disagreed, he thought it was a beer can or something. As we got closer I could see it was a lantern. I got really excited because I collect old lanterns, I wanted to rush right over and pick it up, but I knew we had to have permission from about eight government agencies to disturb anything on the wreck, so I waited."

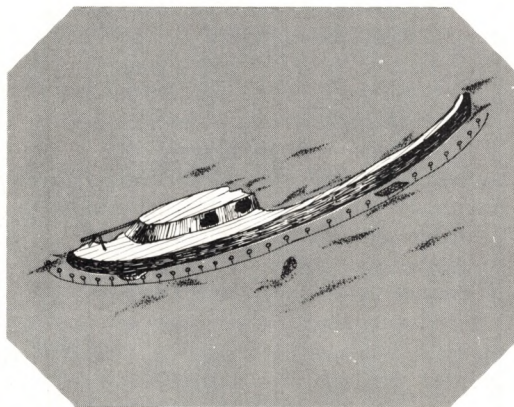
With the help of Floyd Childers and Phillip Johnson of NOAA, the permission was granted, and on the last lock-out dive of the expedition Richard Roesch picked up the lantern and one of



the *Monitor*'s armor plates. Roesch still has some crabs he found living inside the *Monitor* lantern in a saltwater aquarium at his home in Florida.

The idea of preserving ships of historical importance is not new. One such forerunner of the *Monitor* effort was the discovery and salvage of the Swedish ship *Vasa* from Stockholm harbor where it had lain for 300 years. Although the *Monitor* recovery presents more obstacles, the recent summer expedition indicates that far greater success may result than many had expected.

The preliminary archaeology report, prepared by Gordon Watts, states: "While a detailed archaeological assessment of the present condition of the U.S.S. *Monitor* will require a systematic examination of the closed circuit television and photogrammetric data, the nature of work at the site permitted a previously unavailable perspective . . . Detailed structural examination of the wreck confirmed that the condition of the after portion of the hull differed dramatically from the remains forward of, the amidships bulkhead . . . In the stern, the bottom plating of the lower hull was found in excellent condition . . . Along both sides of the displacement hull plating has deteriorated, and frequently only



An iron deck plate (left) and a signal lantern (below) were the only artifacts recovered from the *Monitor*. Both were brought up by Harbor Branch diver Richard Roesch. The diagram above shows the orientation of the *Monitor* wreckage. A line stretched along the side with markers spaced along it is the guide for the Johnson Sea-Link pilots, indicating the lanes for the photogrammetric sweeps.

the remains of the iron ribs survive . . . Inside the hull the vessel's heavy steam propulsion machinery survives in an excellent state of preservation.

"With the exception of that area aft of the turret, the deck was found to be intact and in excellent condition. While the inverted deck was covered by a layer of fouling, no evidence of sagging or plate separation was found. Divers working under the hull in the area of the turret confirmed this observation . . . In addition to observations concerning the condition of the *Monitor*, several new environmental observations



were noted. Perhaps the most significant was the presence of a strata of light gray clay immediately below the sand and shell hash which covers the majority of the bottom in the vicinity of the site. Because a considerable portion of the upper hull of the *Monitor* has settled into the bottom sediment, this clay strata is of considerable importance. If the strata is extensive it could greatly enhance the possibility that those portions of the vessel which exist below the bottom are well preserved."

The recovered signal lantern and the iron deck plate indicate that other artifacts now sealed in the ship or buried in the sand will also be well preserved. Items so fascinating to our own age such as seamen's diaries, Colt revolvers, table settings of silver and china, coins, jewelry, and all those bits of America as it was in 1862 are entombed in the hull of the ironclad. The sand

most likely covers many items and will prove to be an efficacious preservative. Even the legendary black cat locked into the barrel of a Dahlgren gun by one of the original crew just before the *Monitor* sank may emerge a shining white apparition from the past.

The remains of the men lost when the *Monitor* sank will probably never be found, for they likely drowned in the turbulent, wintry seas. When the *Johnson Sea-Link* surfaced with the brass lantern, it was a symbolic link with those men, for it was the "*Monitor light*", the last glimpse the *Rhode Island* had of the ill-fated *Monitor*. The story of what those dives, scientists, and historians saw and recorded on film and tape will be the substance of the next part of this continuing effort to raise and preserve this precious part of our national heritage.

Illustration by Don Warren



"...they had effected for all time
momentous changes in naval tactics
and ship construction."

WORKING DIVER

By Chuck Allen

CLOSING...

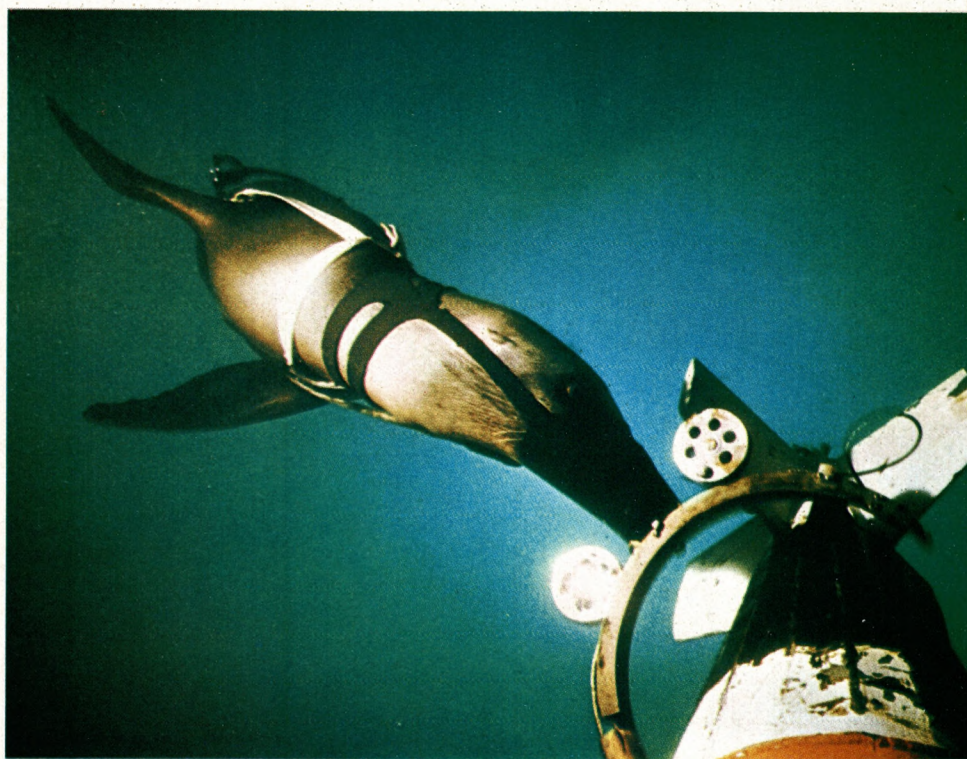
A lot of time and money are expended each year by oceanographic researchers in locating and recovering expensive test objects from the ocean floor. Currently many methods are used to find and raise test objects; among these are saturation diving systems and manned and unmanned submersibles used in conjunction with recovery aids such as pingers or transponders.

A unique approach to object recovery has been developed by the U.S. Navy. The Navy is regularly called on to salvage many sunken objects like torpedoes, aircraft, and missiles, often in conditions that are far less than ideal. Rough weather, poor visibility, extreme depths, and strong currents pose great problems in the use of divers or submersibles for recovery.

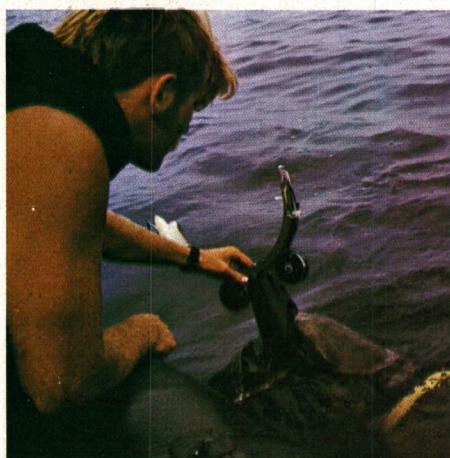
In these circumstances, the Navy relies on Project Quick Find. This program uses California sea lions to locate and attach recovery

gear to submerged objects. The sea lions can be trained to work in depths to 500 feet, and are not incapacitated by currents, dirty water, or bad weather. Compared to many of the other recovery techniques, Project Quick Find is the ultimate in simplicity. All that's required are two men, a rubber boat, a reel of nylon line, a grabber device, and a California sea lion.

Based at the Navy Undersea Center in San Diego, California, the sea lions are trained for approximately one year. The sea lions must learn to allow the trainer to handle them without biting, and to wear and correctly trigger the grabber device attached to their muzzle at least 65 per cent of the time. They must work untethered in open water, so to encourage loyalty



THE GAP



Correctly placing and triggering the grabber device is the most crucial part of the sea lion's training. To do this, the sea lion must, against his instincts, learn to wear a rubber muzzle. Once trained, the mammals work untethered in open water, and always return to their handler for a reward of fish after a successful exercise. The training process can start very early in the mammal's life, and must continue as long as it stays in the program. The training exercises are carried out each day by members of the UDT, EOD, and SEAL teams from a barge anchored near the kelp beds off Point Loma, California.



and quick response to training, the sea lions are rewarded with a handful of fish each time they perform an action satisfactorily.

In order to keep the sea lions' proficiency up, the training must go on continuously. At the U.S. Naval Amphibious Base in Coronado, California, a small group of divers from Explosive Ordinance Disposal, Seal, and Underwater Demolition

Teams perform refresher training daily. A Quick Find refresher team of six men loads a 30 foot barge with four caged sea lions, a raft, a target, and other miscellaneous gear each morning and heads for the outer kelp bed area of Point Loma, San Diego, California. The target is lowered to the ocean floor and released. The barge is then anchored well away from the target

area, usually 500 meters. A sea lion and his handler then board the rubber raft and, reaching the target area, the sea lion is fitted with a rubber muzzle and told to enter the water. A grabber device which resembles a giant handcuff is placed over the muzzle and the sea lion dives for the target. Homing in on the pinger device, the sea lion locates the target, and presses the open grabber against the object. A spring loaded trigger clamps the target securely for hoisting to the surface. The sea lion returns to the raft and his handler for a reward, bringing with him the cable attached to the grabber.

With Project Quick Find, the Navy has demonstrated that marine mammals can be used to perform tasks that are too difficult, dangerous, or physically impossible for men, and has made one more step toward closing the gap between man and mammal.



Treasure Hunting

THE GOOD, THE BAD, AND THE GOVERNMENT

By Steve Blount

In the Florida Straits on a tempestuous night in 1715, a battered flotilla of Spanish vessels runs before a hurricane wind, remnants of the annual plate fleet transporting the metallic riches of the New World to Spain. One by one ships are driven onto shallow reefs or are overcome by the fierce wind and waves. Sinking quickly, they settle on the sandy bottom, taking with them dozens of sailors, and the wealth of the Indies.

With only minor variations the scene was replayed hundreds of times between the 16th and 19th centuries. The treacherous waters around the southern tip of Florida became a graveyard for unknown numbers of Spanish treasure ships, as well as English, French, and Dutch privateers.

Archaeologists estimate that perhaps 5,000 historic shipwrecks of all types, both ancient and modern, lie on the ocean floor off the coasts of Florida. It isn't surprising that when men began to explore the coastal waters of the state, first with hardhat gear, then with scuba, they found wrecked ships. While most of the wrecks are simply piles of rock and corroded metal, some have yielded many thousands of dollars worth of gold, silver, and artifacts. Under the diligent hands of men

like Art McKee, Mel Fisher, Art Hartman, and Jack Haskins, the sea began to give back the treasure it had held so long. This was not work for amateurs. A casual visitor with his basic scuba gear might occasionally find something of value, some coins perhaps, or a jewel case, but most of the valuables were brought up using increasingly sophisticated techniques. The injection airlift was used to siphon sand off the wreck sites, and a device for directing the prop wash of a large boat straight down was invented by Mel Fisher. Magnetometers and side scan sonar are but two of the many expensive tools of the treasure hunter. Some treasure hunters began spending a lot of time in Seville, Spain, searching the Archives of the Indies for clues to the names and locations of ships known to have been carrying precious goods.

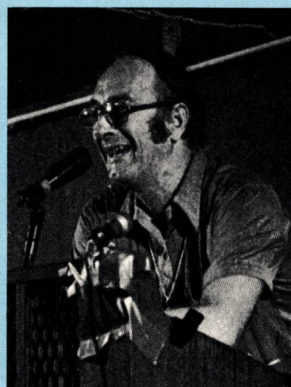
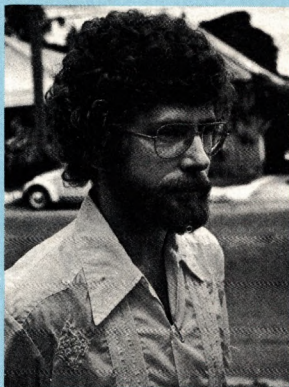
In the 1960's officials of the State of Florida became concerned about uncontrolled salvage of historic wrecks near Cocoa Beach. Since the state owns all the bottom land of all navigable waterways, including the ocean, it was a simple matter to institute a system under which treasure hunters were required to give a percentage of their finds to the state. To administrate the system, they appointed Dr. Carl Clausen, a well known

marine archaeologist. Things went well for a while, the state collecting a part of the treasure, the salvors selling the rest. Then, in 1967 the state legislature passed the Florida Archives and History Act. The Act created a Division of Archives, History, and Records Management, and under it the Bureau of Historic Sites and Properties, which was made responsible for the administration of the shipwreck program.

The stated purpose of this law is to protect the physical remains of the cultural heritage of Florida. The law provides for the employment of a state archaeologist, who is responsible for surveying archaeological sites in the state, supervising the shipwreck program, and protecting the cultural resources of the state.

The wrecks of Spanish plate fleet vessels are an important and highly visible part of Florida's cultural resources. Here, then, is the conflict. Both the government and the treasure salvors wish to extract the archaeological data from the wrecks. The difference is that the salvors want to work the wrecks now, and want to be allowed to keep and sell whatever artifacts they recover. The government would prefer that the wrecks be preserved intact, until some future time that a comprehensive method for excavating them is developed. The state also owns all artifacts found in state waters, and is not legally obligated to share them with anyone.

It is these two points that fueled the heated discussions at the Conference on Florida Historic Wreck Archaeology held in Key West, November 4, 5, and 6, 1977. In three days, the two groups presented their best arguments to each other. The State of Florida was represented by Dr. W. A. "Sonny" Cockrell, state archaeologist, the Federal government by Charles McKinney, head of the Federal Antiquities Program of the Department of Interior. Many notable salvors were there: Mel Fisher, Art McKee, and Jack Haskins among them. Other interested parties present included Dr. Duncan Matthewson, archaeologist of Tierra Marine Associates and a consultant to Treasure Salvors, Incorporated; Dr. Eugen Lyons, a research historian also a consultant to Treasure Salvors, Inc.; and Dr. Carl Clausen, the former head of



Conference participants, clockwise from upper left: Dr. W. A. Cockrell, Charles McKinney, Mel Fisher, Jack Haskins, Dr. John Griffin (center).

Florida's historic shipwreck program.

To understand the importance of the conflict, we must understand the value of the shipwreck and the information it contains. The final disposition of the shipwrecks hinges on the outcome of this conflict.

Is archaeology a useful and worthwhile science? Many laymen view archaeology as an esoteric and practically useless branch of knowledge pursued by frail old men who wear round spectacles and poke about in dusty crypts. Archaeologists are in fact men who attempt to tell us something about ourselves by interpreting the actions and lifestyles of our ancestors.

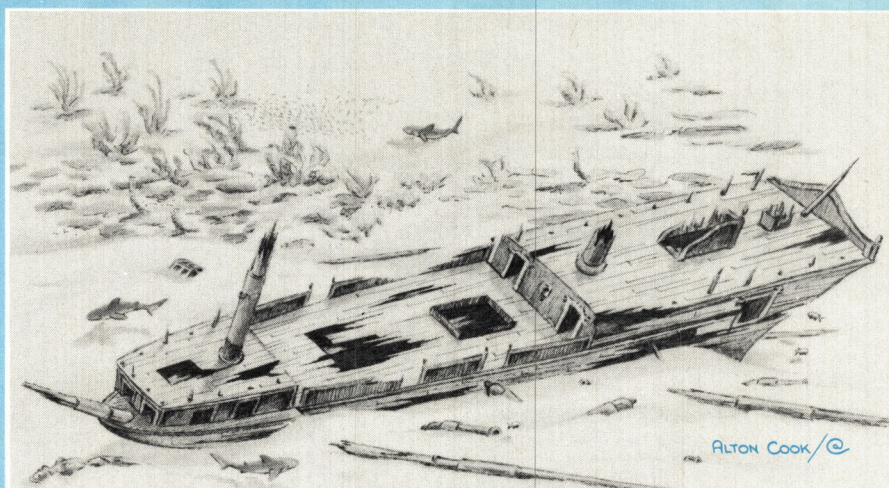
Florida State Archaeologist Sonny Cockrell says, "If we want a perspective on what we are, what we are capable of, then we have to look at other cultures, including those of the past. It is fallacious to assume that people in the past thought the same way we do. We attempt to make inferences from the data about human behavior, and hopefully make predictive statements about the future."

In order to operate and make his deductions, the archaeologist needs to explore the physical remains of the past as they are found, before they have been disturbed. The data must be uncovered in the context in which it is buried for the results to be scientifically valid.

The Spanish maritime culture was, at its peak, the most significant movement of the period as an influence on the history of the southern U.S., Mexico, and South America. The early history of Florida and the Caribbean is virtually written in the blood of Spanish adventurers and the pirates that preyed on them. America's beginnings are part of this movement and the momentous changes it brought to the New World. Now the written accounts of the settlers and sailors and the remains of their ships are all that is left, and it is from these that we must draw both our facts and our understanding.

The big argument between the government and the treasure salvors is over the best way to utilize the resource which the shipwrecks represent. The treasure salvors want to uncover them now, extract whatever data they can, and sell the precious artifacts to pay for the operation. Under an arrangement like this, the government would compete on the open market with collectors for the purchase of significant artifacts to be preserved in public collections. This system has been implemented by the government of Bermuda, and the treasure salvors claim it has been very successful there.

The government claims that such an arrangement will have at least two major



The written accounts of the settlers and sailors and the remains of their ships are all that is left . . .

negative effects. First, they maintain that at this time, the science of marine archaeology is in its infancy, and there does not now exist a comprehensive methodology for extracting all of the significant data from the shipwrecks.

During his presentation at the conference, Sonny Cockrell explained this point: "If we're only interested in what kind of plates they ate off of, or what kind of pipes they smoked, then all we have to do is go dig it up. But what we are really doing is studying the lifestyles, the lifeways of the culture the people on that ship represent. There is a lot more in the archaeological record than just 'goodies'. I think we should preserve the resource, save it intact, until it can be properly worked with all due caution."

The second result, according to the government, would be the dissipation of the physical remains, the artifacts, from the wrecks. The salvors refute this assertion by pointing out that they have donated artifacts to various museums around the world, and have held displays of the treasure they have collected. Mel Fisher, president of Treasure Salvors, Inc., has organized an exhibit which will contain many of the artifacts recovered from the *Senora Nuestra de Atocha*, which will open in Miami in January 1978, and will travel to several countries during the year.

The government is not satisfied with these donations and exhibits. According to Cockrell, very little of the vast amount of material brought up from the 1715 fleet that was retained by the salvors can presently be traced. It's almost as if it has disappeared. Certainly very few of the

artifacts are in public collections.

In pursuit of preservation, the State of Florida passed the Archives and History Act, also known as Chapter 267 of the Florida Statutes. The act states: "It is hereby declared to be the public policy of the state to protect and preserve historic sites and properties, buildings, artifacts, treasure trove, and objects of antiquity which have scientific or historical value or are of interest to the public, including, but not limited to monuments, memorials, fossil deposits, Indian habitations, ceremonial sites, abandoned settlements, caves, sunken or abandoned ships, historical site and properties and buildings or objects, or any part thereof relating to the history, or government of the state. It is further declared to be the public policy of the state that all treasure trove, artifacts and such objects having intrinsic or historical and archaeological value which have been abandoned on state-owned lands or state-owned sovereignty submerged lands shall belong to the state with the title thereto vested in the Division of Archives, History, and Records Management of the Department of State for the purpose of administration and protection."

Punishment for altering, removing, or destroying artifacts or sites on state-owned land, which includes the bottom of the ocean and all other navigable waterways, is a \$500 fine and/or six months in jail.

The Federal government has also initiated strict controls over treasure hunting activities. Through a number of

continued page 144

Photographs by Steve Blount
Story by Steve Blount
and Kathy Bentley

Harbor Branch Foundation....



Photograph courtesy of
Harbor Branch Foundation

We arrived at Harbor Branch just as the sun broke over the tops of the mangroves across the Indian River from Link Port. After some initial confusion locating the front door (it's not marked, and it's not on the side facing the road) we soon found ourselves in the company of diver Richard Roesch, our host at Harbor Branch.

We had initially been attracted to Harbor Branch by publicity surrounding the work done on the *U.S.S. Monitor* by the *Johnson Sea-Link* submersibles. That publicity was itself rare, as very little is written about Harbor Branch. Woods Hole is the big name in marine labs, at Harbor Branch they operate very quietly, but efficiently.

Harbor Branch Foundation, Inc., is a non-profit organization for advancement and research in ocean engineering and marine biology. Harbor Branch was founded by J. Seward Johnson, a man dedicated to preserving the oceans, and it's located at Link Port, Florida, on a channel originally purchased and developed by inventor Edwin A. Link. Link Port is halfway between Ft. Pierce and Vero Beach on the Indian River, a brackish lagoon that is part of the Intracoastal Waterway. The channel is a deep cut made in the west bank of the river in the early 1960's by a company that was mining sand in the area. Edwin Link first saw it in 1965 and realized it was the perfect place to locate his ever expanding research on ocean systems and submersibles. In 1970 J. Seward Johnson began to expand his own ocean research efforts, and again Link Port was the perfect location.

Edwin Link invented the Link Trainer, used to train pilots during World War II, the forerunner of all the

complex simulators used today by air and sea forces, airlines, and shipping companies around the world. He also holds some 27 other patents and is a pioneer in the development of small research submersibles. These submersibles, *Johnson Sea-Link I* and *Johnson Sea-Link II* and their support vessels, *R. V. Johnson* and *Sea Diver*, are easily the most sensational products of Harbor Branch. However, these crafts were essentially developed as tools to aid the scientists in their main long range project: a baseline study of the Indian River coastal zone area ecosystem.

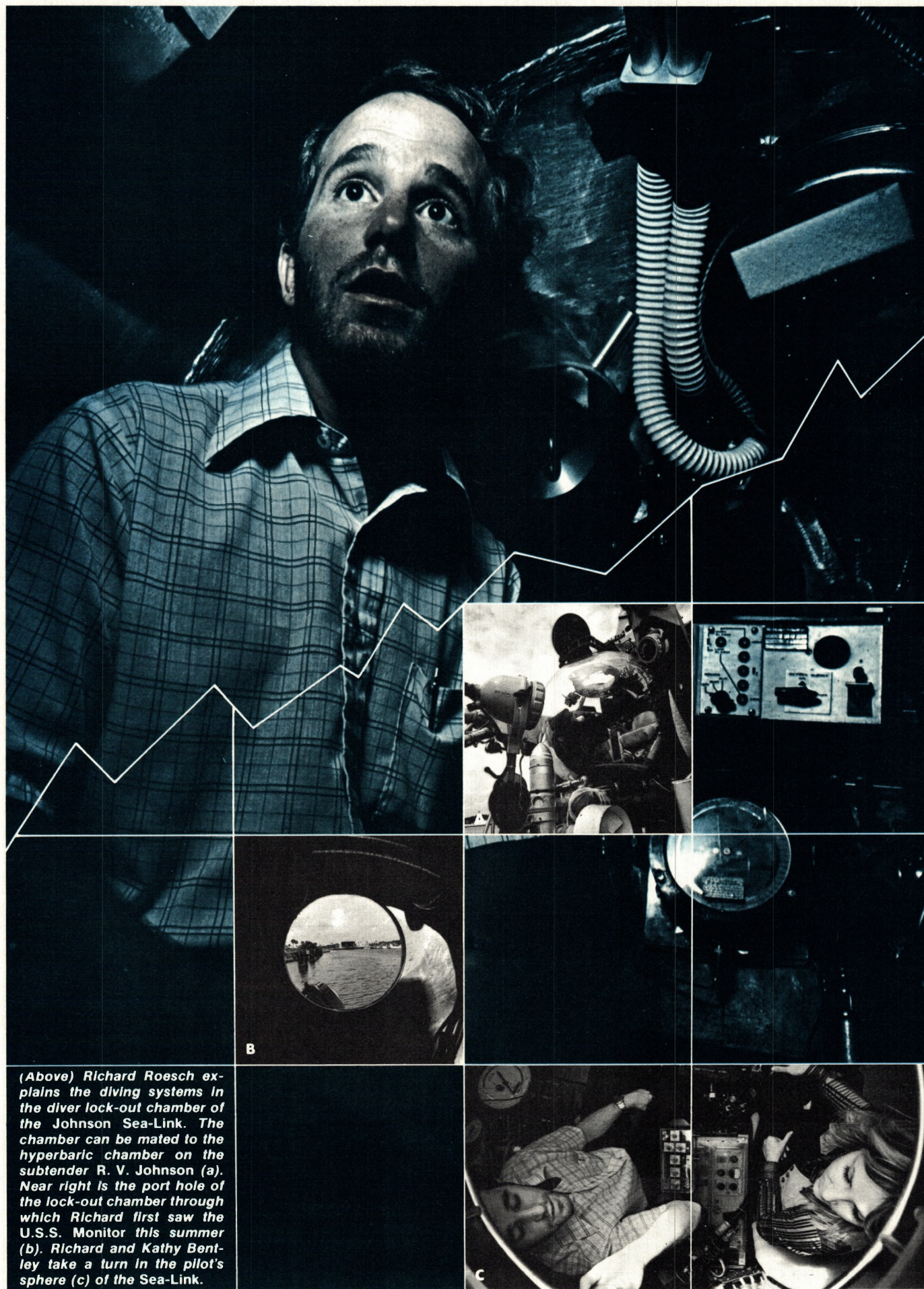
They are a small and clannish group here. There are presently some 150 employees, each knows all the others by name, and our necks were soon sore from acknowledging the friendly good mornings, how're you doings, and glad to meet yous. Draftsmen, divers, scientists, technicians, welders, electricians, seamen, and secretaries all work in a seemingly perpetual atmosphere of cooperation and dedication.

We first toured the Link General Office and Engineering Building, the construction site for the *Johnson Sea-Links*. As we walked through the outer doors of the shipfitting area, the Marine Railway lay straight ahead. The Railway is a dry dock on wheels. Three rails run from the shipfitting area inside the building down to the channel. A dry dock berth or cradle can be run down this track into the water and under a vessel. The vessel is secured and an electric motor hauls the ship out of the water and into the building. Rated capacity is 800 tons, and it was designed to handle the submersibles and research vessels owned by Harbor Branch.

Labs in the Johnson Science Buildings are full of samples, test apparatus, and busy researchers who count, identify, and analyze the biological systems of the Indian River and the near Continental Shelf. Since its inception in 1973, the Indian River project has evolved into the largest privately funded environmental study in the U.S. The Indian River is a bar-built estuary, similar to many others along the southeast coast, and is one of the last pristine hammock environments left on the east coast of Florida. The Foundation's objectives for this study are two-fold: to complete a survey of the Indian River and the complex interreactions of its many biological systems; also to develop a systematic approach to such studies that can be applied to other ecosystems in the future. The amount of data collected so far is simply staggering, so it has been stored on a computer for cross referencing and easy retrieval. More than 1600 species of animals and plants have been collected and identified as well as 17 groups of invertebrates.

The scientists work in teams, each studying a particular facet of the ecosystem. While one group studies the life cycle, range, and life requirements of coral, another is investigating the area's plankton. The plankton group had just finished observing plankton near the edge of the Continental Shelf in 1500 feet of water. From their vantage point inside a *Johnson Sea-Link* they were able to study firsthand the behavior of tiny plants and animals never seen in their natural surroundings before.

It is this unique ability of the *Johnson Sea-Link* to immerse non-diving observers in the ocean environment that makes it such a



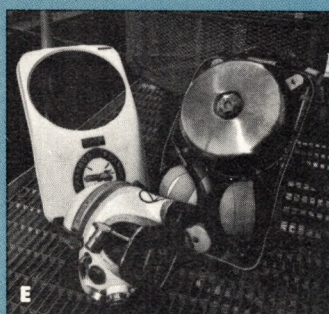
(Above) Richard Roesch explains the diving systems in the diver lock-out chamber of the Johnson Sea-Link. The chamber can be mated to the hyperbaric chamber on the sub tender R. V. Johnson (a). Near right is the port hole of the lock-out chamber through which Richard first saw the U.S.S. Monitor this summer (b). Richard and Kathy Bentley take a turn in the pilot's sphere (c) of the Sea-Link.

fascinating and useful instrument. *Johnson Sea-Links I and II* are state of the art deep-diving submersibles. Operational depth is 1,000 feet, test depth is 2,000 feet, and crush depth is 6,000 feet. *Johnson Sea-Link's* two major structures are a plexiglas pilot's sphere in front, and a barrel-shaped



The Sea-Link is supported by the huge crane (d) that launches and recovers the submersibles.

Harbor Branch Foundation divers use Bio Marine rebreathers when they require extended work times at depth (e).



E

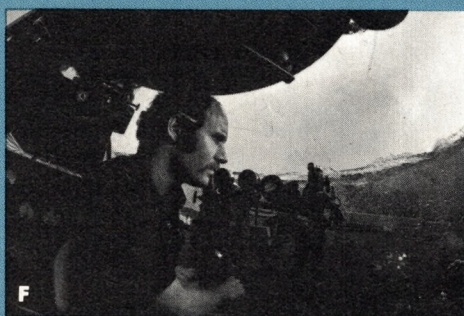
diver lock-out chamber just behind. These two structures are surrounded by framing to which are attached the thrusters, batteries, ballast tanks, and other operational gear. The *Johnson Sea-Link III*, scheduled for completion in early 1978, will have two plexiglas observation spheres, allowing it to carry three additional observers. From the front the *Johnson Sea-Link* looks like a big, myopic insect with large tentacular forelimbs (camera and light booms) poised and ready to strike.

As we climbed into the small diver lock-out chamber, diver/technician Richard Roesch explained the diving systems. Before a deep dive the diver and tender are taken to depth gradually in a hyperbaric chamber beneath the deck of the subtender. After they reach the proper pressure, they crawl through a tunnel and a hatch mated to the already pressurized diver chamber aboard the sub. Once inside, a CO₂

scrubber removes excess carbon dioxide from the chamber atmosphere. A complex valving system connected to an automated gas mixer feeds air, oxygen, and helium into the lines used for the divers' Kirby-Morgan apparatus. Although many dive operations are done with the Kirby-Morgan, the divers also use scuba and the Foundation's Bio-Marine rebreathers. These closed circuit mixed-gas rigs incorporate a CO₂ scrubber and a complex electronic gas mixer, allowing divers to work for approximately six hours without recharging the unit.

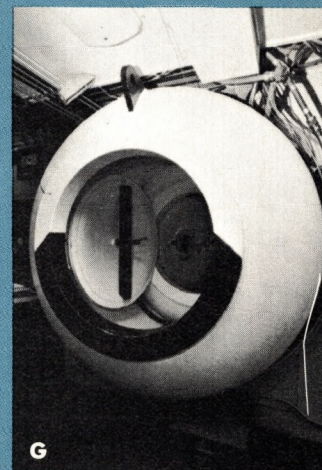
There is always one man in the chamber during a dive. All members of

the two seats mounts the depth read-out and navigational gear, two small clusters of gauges, read out air and pressure data, while a joystick steers the craft. A *Johnson Sea-Link* can be pushed along at one and three-fourths knots by its electric thrusters, which are powered by lead-acid batteries. The sub seems both terribly simple and completely futuristic. This vessel could as easily be on the deck of *R. V. Johnson* or the *Starship Enterprise*, and the galaxies it explores are every bit as exciting and foreign as those travelled by Spock and Captain Kirk. It takes the cold touch of a metal hatch cover to convince us that this craft is indeed



Pilot Tim Askew prepares to take the Sea-Link under (f).

As though made for science fiction, the Sea-Link looks somewhat menacing viewed from the front (g).



G

Johnson Sea-Link crews are divers, and they rotate assignments as divers and tenders. The tender takes care of the diver's communications cables and air supply during the dive and serves as a back up. The members of the sub crews are also in charge of assembling and maintaining the submersibles. Each of them is well versed in the mechanics of the craft, and can tear down and repair a malfunctioning thruster or equipment arm quickly and efficiently. This interchangeability of personnel gives Harbor Branch its flexibility of operation. Operations are never cut short or scrubbed due to absence or sickness of a crew member.

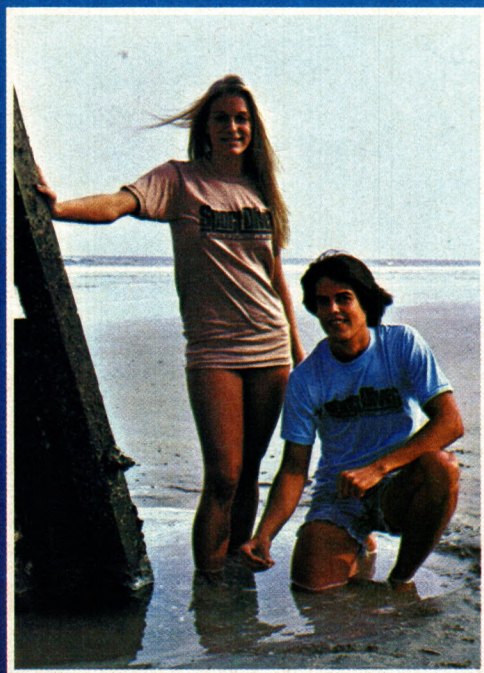
Inside the pilot's sphere of a *Johnson Sea-Link* you feel like you're in a goldfish bowl, and all the fish are outside. The panoramic view is stunning, 120 or 130 degrees in all directions. The actual controls for the sub are minimal. A console in front of

aboard *R. V. Johnson*, and it really does routinely take divers down to 1000 feet.

This duality of startling science fact/fiction pervades much of the work done at Harbor Branch. If it is sometimes hard for the pragmatist to see where all this research is headed, it must be remembered that Harbor Branch is privately funded; it does not rely on result-oriented grant money. If the value of this kind of basic investigation seems dubious, ask yourself where we'd be if Benjamin Franklin had been poor and had to ask Congress for a grant to buy a kite, a key, and a ball of string.

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2. Saltwater b&w.
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5. Fixed focus Photography-color.
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Entry deadline March 31, 1978.

COMPETITION RULES:

Contest is open to all amateur photographers.

All entries must be sent pre-paid with pre-addressed return envelope and sufficient return postage. All entries will be returned the week of, or before the final winning announcement.

Print size shall be a minimum of 3½x4½ inches, maximum of 8x10 inches, glossy finish and mounted on an 8x10 inch mount board. Entrants name, address and print title must appear on the back of each board.

Slides must be 2x2 inches mounted and inserted in plastic storage protectors with the entrant's name, address and title.

Movies must be 8mm, super 8, or 16 mm with or without sound, 15 minutes or less, with 75% or more exposed underwater and containing entrants name, address and the film title marked on the container and film leader.

All possible care will be exercised, but no responsibility will be assumed by SPORT DIVER MAGAZINE or UIPA for the loss or damage of entries.

Judging shall be done by the photo competition committee using a basic point system on technique, composition, color, quality and story. Decision of the committee will be final.

Winning photographs will be announced and displayed in the Spring 78 issue of SPORT DIVER MAGAZINE. Entrants completed entry form acknowledges reprint rights to publish by SPORT DIVER MAGAZINE.



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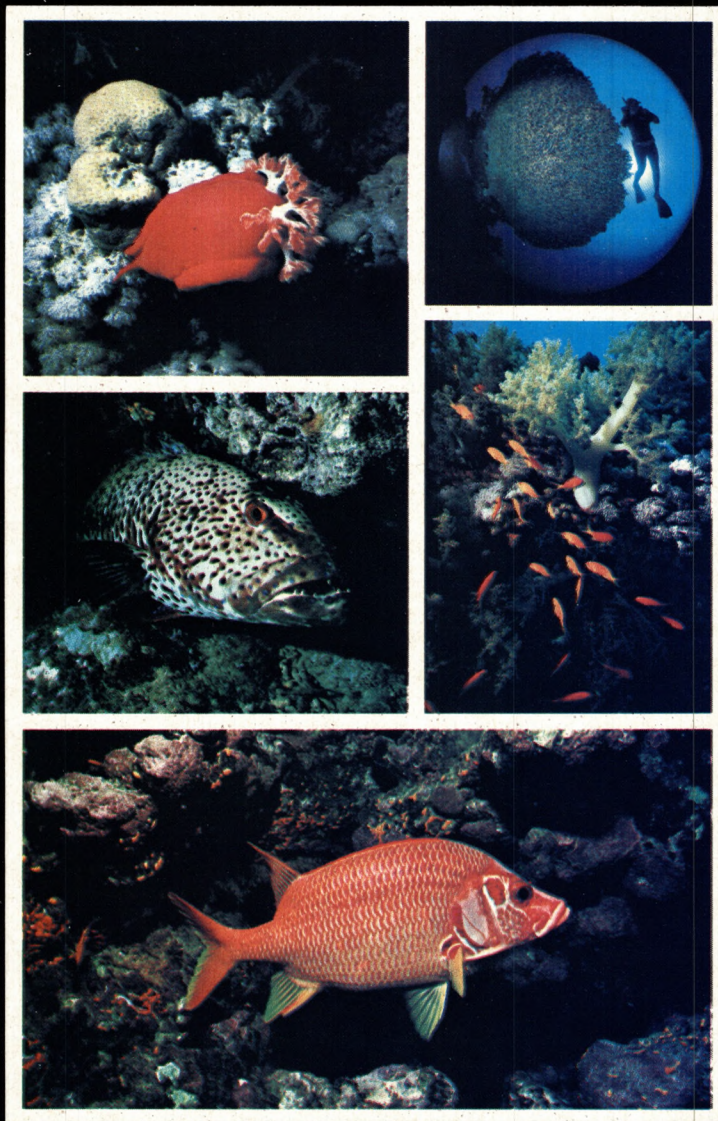
Type of underwater camera most often used? _____

Please indicate amount of entries enclosed for each category.

Cat. Number 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 8 _____

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CLASSES: Plant and static life, animal life, and man in the sea.

Entrants, placed first, second and third in each class, will be awarded gold, silver, and bronze medals respectively. The three gold medalists will then compete for the best black and white print award—The Andromeda Sinai Reef Club Trophy.

(a) Up to five prints will comprise one entry, up to 10 prints two entries and so on. There are no restrictions on the number of entries. Contestants must write on the back of each print "Plant", "Animal", or "Man in the Sea", so that they can be judged in the class indicated.

(b) The judges reserve the right to place a picture in a class other than that in which it was submitted.

(c) Prints must not exceed 14"x20" in size. They must be mounted on a standard cardboard, but may be cropped to any size within those dimensions.

2. Color Prints

The conditions are the same as for black and white prints.

CLASSES: Plant and static life, animal life, and man in the sea.

Entrants, placed first, second and third in each class, will be awarded gold, silver and bronze medals respectively. The three gold medalists will compete for the best color print award—The Di Zahav Diving Club Trophy.

3. Color Slides (35mm or 6x6)

CLASSES: Plant and static life, animal life, and man in the sea.

Entrants, placed first, second and third in each class, will be awarded gold, silver and bronze medals respectively. The three gold medalists will compete for the best color slide award—The Aqua Sport Diving Club Trophy.

(a) Up to five slides will comprise one entry, up to ten slides two entries and so on. There are no restrictions on the number of entries.

(b) Each slide should be marked "Plant", "Animal", or "Man in the Sea" to facilitate judging.

(c) The judges reserve the right to place a slide in a class other than that for which it has been submitted.

(d) Slides must be submitted in mounts.

4. Cine Films (Super 8 or 16mm)

Entrants, placed first, second and third, will receive a gold, silver and bronze medal respectively. The gold medalist will also receive The Israeli Underwater Federation Trophy.

(a) One cine film will comprise one entry with no restrictions on the number of entries.

(b) Films may be black and white or color, with or without sound.

(c) Films must be limited to 30 minutes in length if Super 8mm, and no longer than 40 minutes if 16mm, but the organizers reserve the right to show only extracts at the festival if necessary.

(d) Instructions for projection and sound must be included in a conspicuous place in film can or carton and the running time must be indicated.

(e) All films must have beginning and ending titles.

(f) Name of contributor and film title must be clearly marked on the leader of the film and container in which it is sent.

CONDITIONS OF ENTRY

1. The entry fee is U.S. \$5.00—or the equivalent in foreign currency per set of either five prints, five color slides or one cine film. Competitors may enter as many sets as they wish. Checks or money orders should be made payable to "International Red Sea Film Festival—1978" and send to P.O.B. 29234, Tel Aviv, Israel.

2. Entries received without an entry form or an entry fee will not be eligible for judging and will be retained until return postage is received. The entry form must be signed by the copyright owner, agreeing to these conditions or entry.

3. Entries must be received not later than January 15, 1978.

4. The organizers of this Film Festival will have the right to make use of winning entries and those for exhibition in the following ways:

(a) To distribute copies to institutions throughout the world who request the organizers' permission to exhibit or publish them in connection with publicizing the Film Festival.

(b) To provide copies to such media as may wish to reproduce them in connection with publicizing the Festival.

5. Contestants from abroad must pre-pay transportation charges for their entries and other items addressed to the organizers. Whatever duties are involved must also be prepaid by contestants.

6. The organizers will take all reasonable care of entries, but cannot accept responsibility for non-receipt, loss or damage.

7. All entries must have been exposed underwater; and material submitted must be the work of the contributor. The following must appear on the back of each print: Name of contributor, address, club (if any), title or caption and number. The name of the contributor and the slide title must be clearly marked on each slide.

Pro Dive Store Directory

Pro Dive Store Directory

Pro Dive Store Directory

The Professional Dive Store Directory is a guide to help you find air, service, instruction, and information wherever you dive. The stores are listed alphabetically by cities, which follow the state headings in alphabetic order.

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NASDS Inst.-Full Svs. Scubapro Shop-Air-Rentals-2 man chamber-Hydro & Tumble-Boat Trips-Catalog Sls-C card reqd. 503 Water St., Ketchikan, Alaska 99901 (907) 225-5020

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(213) 927-1417

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Orbit Marine Sports Center
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Complete diver services-Air 5000-Rentals-Trips. 20 N. Atlantic Ave., Daytona Beach, Fl. 32018 (904) 253-7558

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(904) 253-7221

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Sales-Service-Inst.-Air-Scubapro-Dacor-U.S. Divers-Farallon-Ikelite-Bayley. 3448 W. University Ave., Gainesville, Fl. 32607 (904) 373-9233

The Scuba Shack
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American Diving Headquarters
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Bill Crawford's Tropic Isle Dive Shop
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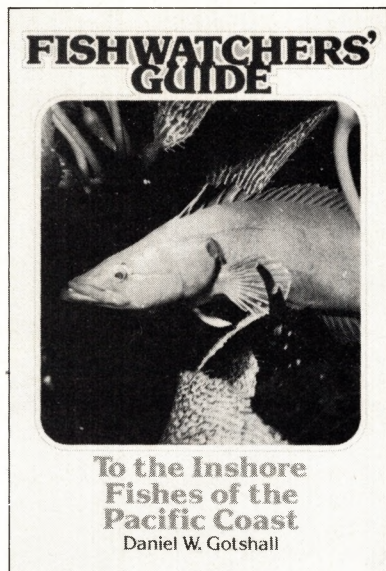
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Blue Hole Diving

continued from page 121

significant archaeological site was destroyed. It is sad to think that these caves have already been plundered. Many of the stalactites and stalagmites in Ben's Cave have been broken off by divers hunting souvenirs. For this reason the local cave divers may be very reluctant to share their finds with visitors.

Blue hole diving is cave diving with most of the natural hazards found in other caves, and only certified cave divers should attempt to dive any cave. In addition, the reversing currents can be very complex and very hazardous, so expert local knowledge is required to safely penetrate the blue holes. Excellent cave diving instruction is available through the National Association of Cave Divers (NACD).

The Underwater Explorers Society, UNEXSO, offers guided tours to some of the caverns and caves in Freeport. Dennis Williams, an NACD certified diver and NAUI instructor, runs these tours. Dennis and Glen Taylor were the original explorers of many of the caves on Grand Bahama Island, and it is with their help that I was able to explore and photograph the beautiful underwater formations.

Women in Diving . . .

continued from page 114

The remaining afternoon programs included Jeanne Bear Sleeper, Special Projects Director at NAUI Headquarters, urging all of us to "flaunt our inner magic". She encouraged instructors to "touch" their students and pointed out the unique ability of women scuba instructors to "touch" their students with a protective heart and hands.

Dale Cyphert of University of California at Davis elaborated on the sex roles women are conditioned to perform, causing them to be overly dependent on and pampered by male diving buddies. Allowing these roles to be played out in the basic scuba class can lead to lack of experience in the female diver and the feeling of being just a buddy and not a capable, self-sufficient diver.

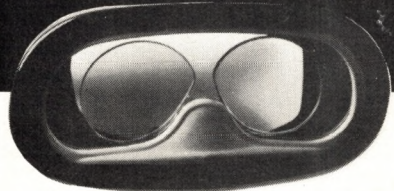
Janice Spurlock, a journalist from San Diego, wearing an appropriate "Women Make Better Divers" tee-shirt, closed the formal program with samples of diving equipment specifically manufactured for the small-statured diver.

The closing presentation was an informal panel discussion by women involved professionally in diving, explaining how they got there and what channels to follow if you have similar goals.

It was a program long overdue, a special thank you is due to Dennis Graver, Sonna Whisenand, and all the PADI staff who made our day possible by providing the platform and impetus. The proceedings of the seminar are due for publication in January, 1978. Contact PADI Headquarters, 2064 N. Bush St., Santa Ana, CA 92706 for further information.

Biologist, bio-chemist, photographer, author, instructor, researcher, administrator, explorer; women have done, and will continue, to do it all. As Charlie Brown observed, "The only thing wrong with women in diving is that there aren't enough of them."

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BENEATH THE SEA

continued from page 79

sensation in the mouth and throat as the meat was swallowed, and 20 minutes later some felt their mouth, lips, and tongue growing numb.

Morays have a curious habit that has contributed to the spread of tall tales. When in trouble they throw their bodies into an overhand knot. This trick is often used when struggling with an octopus. The eel forces the knot forward in order to dislodge the cephalopod's grip. A moray hooked on a line will try the same trick, and in doing so will climb the line, tail first. Imagine the fisherman's first thoughts as he sees what appears to be a large tentacle slithering into the boat. Off Palm Beach, Florida, three anglers jumped overboard when a large, brown moray came writhing tail-first into their boat.

Reviled and feared, the moray has historically been one of the least attractive reef inhabitants. With a little knowledge and curiosity, the moray becomes a beautiful and interesting part of the reef environment.



Treasure Hunting

continued from page 131

laws already on the books, regulatory procedures, and litigation, the Department of Interior aims to halt all salvage efforts in Federal waters. The government wants to establish more marine sanctuaries, such as the one surrounding the *U.S.S. Monitor* off Cape Hatteras. Diving is not allowed in the area without permission, and the fine for anchoring over a marine sanctuary is \$50,000 per day. Charles McKinney does not rule out the possibility of such a sanctuary in the Florida Keys, one which might encompass known wreck sites.

There is some doubt of the constitutionality of the Federal government's program. A case that will explore this question, and one which sums up many of the facets of this conflict, is now being processed through the courts. This is the case of *Treasure Salvors* and *Armada Research Corporation* versus the United States of America.

Treasure Salvors, under the direction of its president, Mel Fisher, is one of the most active of the treasure hunting firms. In 1622 a Spanish treasure ship, the *Senora Nuestra de Atocha*, sank in the Florida Straits. She was carrying over 900 silver ingots, some 250,000 gold coins, and jewels, works of art, and other valuable artifacts. After a search which

took three years and many thousands of dollars, Mel Fisher found the *Atocha*. Some 45 miles west of Key West, far from the spot where she was popularly believed to have sunk, the *Atocha* was discovered, a slightly irregular mound on the sandy ocean bottom. Using air lifts and prop blasters, *Treasure Salvors'* divers began clearing away the overburden. In about a year they brought up an estimated \$6 million dollars of artifacts, still only a pittance compared to the value of the total cargo. Fisher's work was interrupted by the State of Florida. Since the *Atocha* lay in state controlled waters, and Fisher had been working under a research permit from the division of Archives, History, and Records management, he was obliged, as per the terms of the permit, to turn over 25% of the artifacts to the state. This was done, and Fisher went back to work on the *Atocha*. Meanwhile, a Supreme Court decision in 1973 changed the boundaries between state and Federally controlled coastal waters, and suddenly, the *Atocha* was in Federal waters. The Federal government decided they would rather not have work continued on the *Atocha* site, and *Treasure Salvors* personnel were forcibly prevented from resuming salvage efforts.

Treasure Salvors then filed a suit against the United States alleging that the U.S. was violating the Geneva Convention on the Continental Shelf, a treaty signed by the U.S. and 135 other nations in 1968. The Convention says that coastal states exercise sovereign rights over the Continental Shelf "for the purpose of exploring it and exploiting its natural resources." The International Law Commission has interpreted this clause to mean: "It is clearly understood that the rights in question do not cover such objects as wrecked ships, their cargoes (including bullion) lying on the sea bed or covered by the sand of the subsoil."

Article Six of the U.S. Constitution states "All treaties made under the Authority of the United States shall be the Supreme Law of the Land and the Judges of every State shall be bound thereby." If the sovereign prerogative mentioned in the Geneva Convention does not include salvage rights, then the U.S. must respect Fisher's claim of ownership.

There is some disparity here in the interpretation of the extent of a coastal state's sovereign rights. The sovereign prerogative claimed by the United States in this case is a notion derived from English common law. The king was vested with the right and title to all discoveries made by his subjects, including sunken treasure.

U.S. District Judge William Mehrrens ruled in February, 1976, that the United States was indeed violating the

Geneva Convention on the Continental Shelf, and awarded the *Atocha* to *Treasure Salvors*. The United States has appealed this ruling and arguments were heard before the Fifth Circuit Court in New Orleans on November 15, 1977. Although no decision has been reached by that court, it is almost certain that the case will end up before the Supreme Court of the United States.

No matter what the outcome, the eventual decision will definitely alter the legal status of treasure hunters. It will either ratify the government controls or remove them.

The roots of this controversy are in the salvage for profit of historic artifacts, and it does not much affect the average sport diver. Of course, it has become illegal to remove artifacts, and sport divers were involved in the depredation of some wrecks. The State of Florida is not too concerned about the impact of sport divers on historic wrecks. Most of the easily identifiable wrecks were located and cleaned out years ago. The ones that remain are almost impossible to find without long experience and expensive test equipment. The state plans to reconstruct one or more wreck sites in the Keys for the use and enjoyment of sport divers. They will be restored to their natural state, complete with ballast stones and artifacts, and will be well marked. Hopefully there will also be a facility displaying artifacts and offering interpretive exhibits nearby.

The question of the legal status of treasure hunting is not the only one left unresolved. What is legal is not always right. At the Key West meeting Jack Haskins said, "To me, the loss of the people's freedom of discovery and exploration is far worse than the loss of some cultural data. I don't want Big Brother tugging at my flippers wherever I go."

Sonny Cockrell responded, "The Indian fighters and buffalo hunters might have felt the same way in the late 1800's."

Here we have two rights in direct opposition. One right is that of an individual to free enterprise and exploration. It is this incentive that uncovered the wrecks in the first place, and spurred some of our finer achievements. The other is the right of the collective whole, the nation, to preserve and dispose of its cultural heritage in a manner prescribed by its elected representatives. This opposition of principles, both of them sound and "right", is the hardest type of question for any society to handle. In the United States we leave the resolution of such disputes to the courts, and that is where the matter now rests.



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